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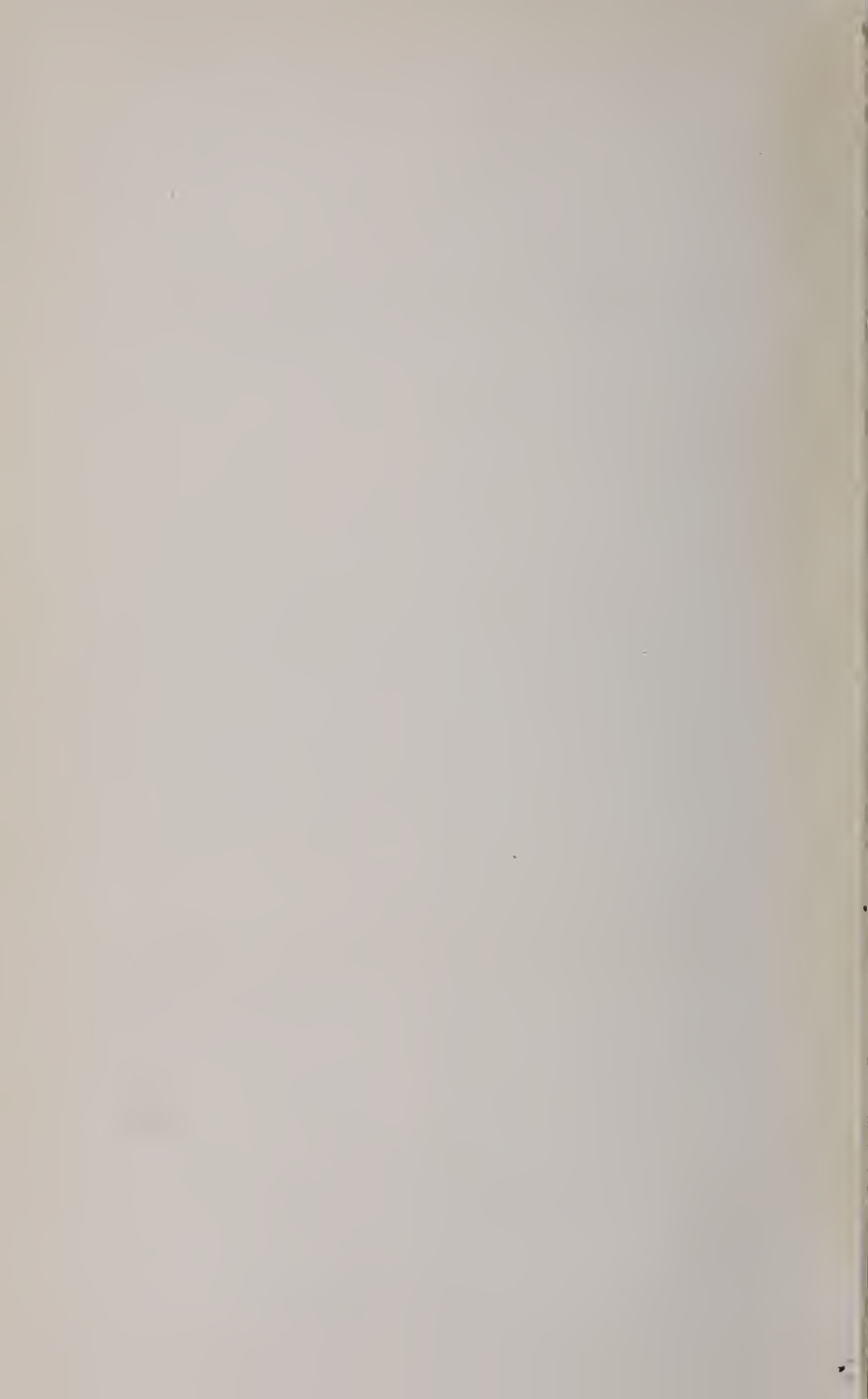
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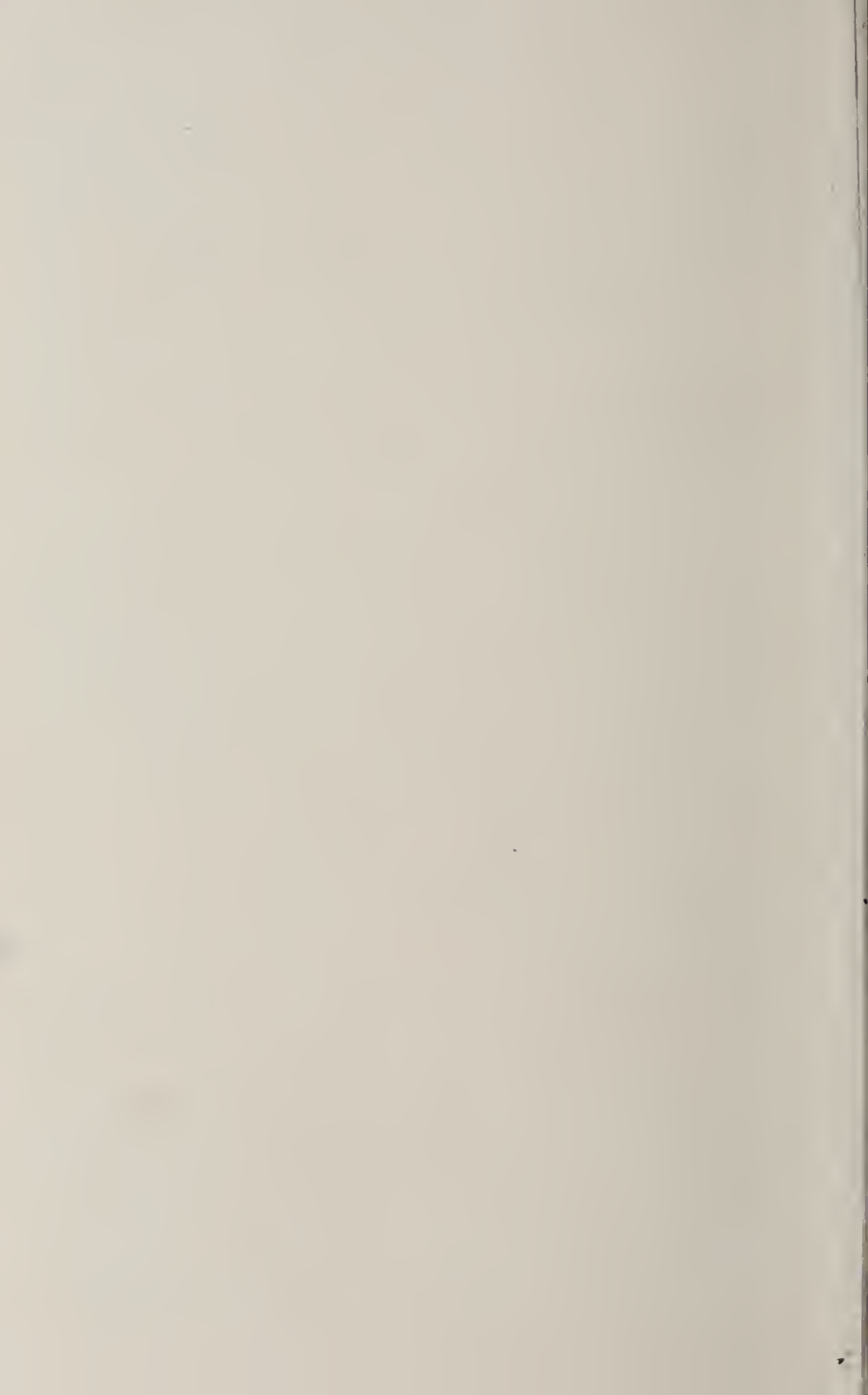
PART II.—JULY TO DECEMBER, 1847.

"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of Asia will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted, and it will die away if they shall entirely cease."—SIR WM. JONES.

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JOURNAL

OF THE

ASIATIC SOCIETY.

OCTOBER, 1847.

On the tame Sheep and Goats of the sub-Himalayas and of Tibet.

By B. H. HODGSON, Esq.

Zoologists, seeking to deduce the essential characters of species and genera, very properly give an unlimited preference to wild over domesticated animals, as exemplars of their several kinds. But in an æconomical point of view, the world at large as properly feels a higher interest in the tame species, and particularly in those herds and flocks, which contribute so largely to the food and clothing of mankind. England stands pre-eminent in Europe for the attention paid, not only to the breeding, but to the describing, of her domesticated animals, being fully aware that accurate book lore is always apt to be subservient in various unexpected ways to practical utility. It is, therefore, somewhat surprising, that the widely diffused colonists of England, have not imitated the excellent example of their compatriots at home, and that the herds and flocks by which Britons are surrounded in the colonies of the empire, yet remain almost wholly undescribed.

I trust that this reproach to the colonial residents may ere long be wiped away, and that some of the many enlightened and able men, scattered over the Indian continent, from the snows to Cape Comorin, will be induced to favour the public with descriptions of the numerous breeds of large and small horned cattle, that are to be found in the various provinces of this vast country.

I purpose, on the present occasion, to describe the several breeds of tame Sheep and Goats, proper to my own vicinity ; and hereafter to give

a similar account of the large horned cattle or Bovines, that is, the tame Oxen, Buffaloes and Bisons, reared between the Tarai or skirt of the plains of India, and the trans-Himálayan plains of Tibet.

I shall begin with the sheep, and, in order to mark more distinctly the *essential characters* of each of the two groups to be now reviewed, I shall commence, in regard to each, by setting down those characters in the usual manner of Zoologists.

The tame sheep of the world at large have been supposed to retain so few of the original marks of their race, that it has been thought difficult or impossible to point out their wild progenitors. Perhaps a good deal of this difficulty has arisen from the heretofore imperfect examination of the wild races, and from the manner in which the distinctive characters of the whole of them have been lumped together to constitute a single Genus *Ovis*. In a paper recently presented to the Asiatic Society of Bengal, I have distributed the wild sheep known to me into *three* genera. And to that paper I beg to refer the curious reader, merely observing on the present occasion, that the sheep proper, typed by the wild *Argalis* of Siberia and of Tibet, exhibit the whole of the following characters, which are likewise common to all the several breeds of domesticated sheep now to be described, with the single and but very partial exception of 'horned females,' some of the following tame breeds having females, sometimes void of horns.

Genus *Ovis*.

Sheep-proper.

Horns in both sexes.

No muffle.

Eye pits large, but immoveable.

Feet pits small in all the four feet.

Inguinal glands large, with a copious secretion, but vaguely defined pit or vent.

Caleic glands or tufts, none.*

Teats two.

No odour in the males.

These animals have, for further and subordinate marks, massive angular compressed and heavily wrinkled horns, inserted proximately on the top of the head, and turned sideways almost into a perfect circle,

* For these organs see Journal Asiatic Society, above referred to.

and their flat points again more or less reverted outwards and backwards, sometimes so much as to describe a second circular curve, whereby the twist becomes spirate: also, short deer-like tails; and, lastly, no beard nor mane. Requesting the reader to keep these general designatory marks of all true sheep in mind, I now proceed to exhibit in the particular portrait of each tame breed, the special modifications to which these primitive marks are subjected by domestication, as well as the other and more popular traits of each breed.

1. *Ovis húná*.—The Húná of western, and Hálúk of eastern, Tibet. This tall and graceful animal is the blackfaced or polycerate sheep of Thibet, the especial breed of that country, and one which is well known to European visitors of the western Hímálayas, as the common beast of burden for the transit of the snowy region, being singularly docile and sure-footed. The Húná is a large species, measuring 4 to $4\frac{1}{2}$ feet in length from the snout to the vent, and $2\frac{1}{2}$ to $2\frac{3}{4}$ feet in height. Head to occiput (straight) 11 to $11\frac{1}{2}$ inches. Tail only, $4\frac{1}{2}$ to $5\frac{1}{2}$ inches. Tail and wool, $6\frac{1}{2}$ to $7\frac{1}{2}$ inches. Ears $4\frac{1}{2}$ to $5\frac{1}{2}$ inches. Girth behind the shoulder 3 feet to $3\frac{1}{4}$ feet. Maximum length of the horns along the curve 18 to 20 inches, and maximum girth at their base 6 to 7 inches. Both sexes have usually horns, and the males are almost never devoid of them, the females, rarely. The horns of the Húná are distinguished for attenuation and consequent separation at their bases. But these characters are only relative, like those of the comparative smoothness of the horns, and their higher compression as contrasted with the horns of the wild race, as well as of some of the tame ones that will follow. For the rest, the horns of the Húná exhibit with sufficient distinctness the characters both of form and curvative proper to the wild type, being triangular, compressed, transversely wrinkled, and curving circularly to the sides so as to describe two-thirds of a perfect sphere, when their smooth flat points are again reverted outwards and sometimes backwards, and so much so as to describe a second nearly perfect circle. I have not noticed this tendency to the spiral or corkscrew twist in the wild race. It is only very imperfect in the tame, and such as it is, is the product of advanced age, very probably equally characterising the wild race in old age. The moderate-sized head of the Húná has great depth, moderate width, and considerable attenuation to the fine oblique muzzle, which shows not the least sign of nudi-

ty or moistness, and has the narrow nostrils curving laterally upwards. The chaffron, or bridge of the nose, is moderately arched or bombed, but more so than in the wild race; and the forehead is less flat and less broad than in the Argalis, being slightly arched both lengthwise and across. The longish narrow and pointed ears differ from those of the wild race, only by being partially or wholly pendent, whereas in the wild race they are erect or horizontal and much more mobile, acting efficiently like moveable funnels to catch every sound, a security denied to the several tame races, which, looking to man for their protection, seem to lose the mobility of the ear, as a consequence of disuse or less frequent and active use of the organ. The eyes, of good size and sufficient prominency of orbit, are seated near to the base of the horns and remote from the muzzle; and beneath them is the eye pit, strongly marked both in the skin and scull, and carrying off a specific secretion, though both the gland and its vent or pore are apt to escape observation, owing to the woolly coverture of the creeks prevailing throughout the eye pits, even in their interior. The neck is rather thin and short. The body moderately full and somewhat elongated. The limbs rather long and fine, hardly less so than in the wild race, and not remarkably rigid or perpendicular, except perhaps by comparison with those deer-like races. The hoofs compressed and high. The false hoofs small and obtuse. The feet pits are common to all four feet, and small only by comparison with those of Deer and Antelopes, large in comparison with those of Goats,* and provided with a distinct gland, yielding a specific secretion which is viscid and aqueous when fresh, candid when dry, and nearly void of odour. Not so the secretion of the groin glands-organs, which in the Húniá are conspicuous, and yield a greasy fetid subaqueous matter, which passes off constantly by a vaguely defined pore, quite similar to that of the axine deer, but less definite in form than in the true Antelopes; of which the Indian Black, or Sásin, offers an excellent and familiar exemplar.

The possession of these organs has been denied to the sheep by most writers. Wherefore I have been more particular in describing them; and may add, that they belong to the two wild and six tame races of these regions without exception; and may, therefore, be considered emphatically normal. Sheep are pre-eminently Alpine animals, and it

* See accompanying sketches.



1. Foot pore of Sheep. 2. Foot pore of Goats. 3. Head of Barwal. 4. Head of Silinglu.



is, therefore, not surprising that the tame and wild breeds of the *Himálayas*, mountains which constitute so unrivalled a part of the "dome of the world," should be pre-eminently characteristic; nor that the same regions should, in the wild *Nahoors* and *Barhels*, exhibit samples of abnormal sheep; and such I take to be these last named *Himálayan* species, and likewise the wild sheep of Europe or the *Mouflons*; whilst the *Argalis*, both of Asia and of America, constitute the true type of the *Ovine* family.*

The tail of the *Húniá* is invariably short, though less remarkably so than in the *Argalis*, yet still retaining the same essentially deer-like character. It is cylindrico-conic and two-thirds nude below, differing little or not at all from the same organ in the several other tame races of these regions, where long-tailed sheep are never seen till you reach the open plains of India; and, as upon those plains not only are *all* the sheep long tailed, but *Dumbas* or monstrous tailed sheep are common, whilst the latter also are totally unknown in the hills, it is a legitimate inference, that this caudal augmentation in most of its phases is an instance of degeneracy in these pre-eminently Alpine animals, and that, therefore, 'tis vain to look in the wild state for any prototype of at least the more egregious of the macropygean breeds, how great soever be the historical antiquity of the *Dumbas*.†

Having now described the *Húniá* from the tip of his nose to the end of his tail, I may conclude with his œconomic qualities, first resuming that this fine breed is characterised by extreme docility, by superior size, gracefulness of form, slender horns, of which there are frequently four, and rarely, even five, a polycerate tendency displayed by no other tame breed of these regions; and, lastly, by the almost invariable mark of a black face. The general colour is almost as invariably white. I never saw a wholly black sheep of this breed. Nor I think one with perfectly white face and legs. Both the latter parts are characteristically and almost invariably dark, black or brown, and there are patches of the same hue, occasionally, on the neck or hips: but rarely.

This genuinely Tibetan race cannot endure the rank pasture or high

* See paper above referred to in *Journal Asiatic Society*.

† The range of civil, as compared with physical, history, is as 5000 years to periods, the imagination can hardly cope with, though fossil Zoology gives demonstration of their reality and successive character.

temperature, or both, of the sub-Himálayas south of the Cachar; the Cachar being the juxta-nivean region of these hills, where vegetation and temperature are European and quasi Arctic. But the Húniá does very well in the Cachar, and may with care be bred, or at least fattened, in the central region at heights not under 7 to 8000 feet, where the maximum temperature in the shade is about 70°. It is a hardy animal, feeding freely and fattening kindly. Its mutton and its fleece are both excellent in quality and very abundant in quantity, so that I should suppose the animal well worthy of the attention of sheep-rearers in cold climates. The wool is of the kind called long staple, and is valued by the export at 8 pence per pound.* The Tibetans who dress entirely in woollen, are clothed almost solely from the fleece of the Húniá, an excellent material but unskilfully wrought by them into cloth, blankets, and felts, as well as knitted into long stocking boots.

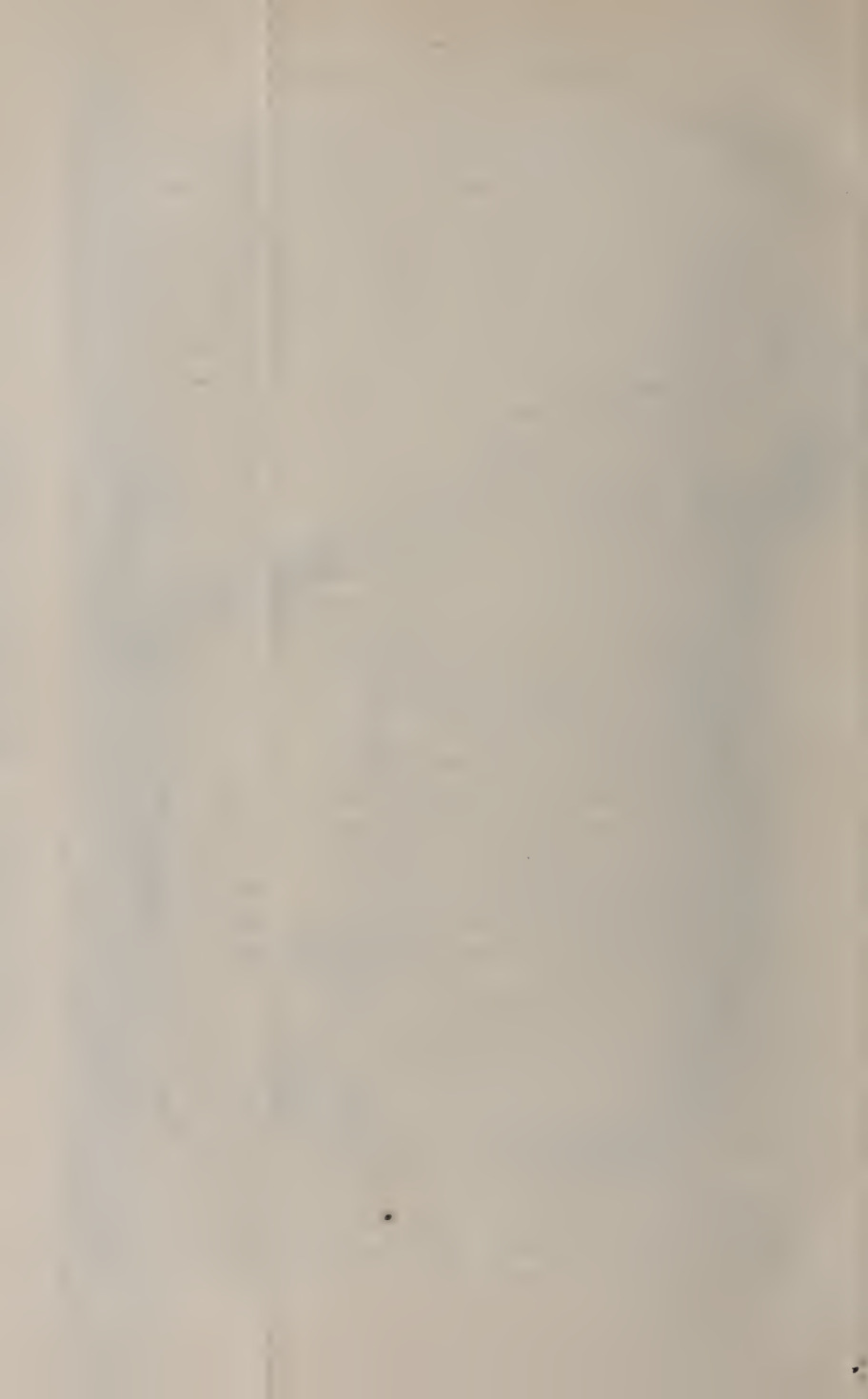
2. *Oris silingia*.—The Siling sheep or Pélúk of eastern Tibet and of Siling. Eastern Tibet is the Kham of the natives of that vast plateau and is a part of it less elevated, less rugged and less cold than the central, and yet more so than the western, portion. Towards Assam, in the valley of the Sápú, rice is grown in Kham or eastern Tibet, a fact decisive of the high temperature of Kham, as compared with Utsang and Nari, or central and western Tibet. Indeed the plateau of Tibet descends rapidly all the way along the course of the Sápú or Brahúnáputra from its source to its gorge or exit from the Himálaya.† But still Kham must be described as a country of very moderate heat as well as of great dryness. North and east of Kham, on the verge of China, and separated from the Chinese provinces of Sifan and Shensi by the Peling mountains is Siling or Tángút, a colder and loftier region like Nari, and comprising the upper course of the Hoangho, as Nari that of the upper Bramhaputra. Siling is a country of great but vague celebrity, the Singapúr of the trade of high Asia, the cradle of the Chinese and Mantehurian families of mankind, and possibly of the

* See Journal of the Agricultural Society, Vol. V. Part IV. p. 205. I shall be happy to facilitate the procuring of the animal or its wool for an experimental Essay.

† Tibet is the vale of the Indus and Sápú, the watershed being near the holy lakes, where the elevation is high 15,000 feet. At its gorge the Indus is not under 10,000. The Sápú towards its source in Nari is above 15,000: towards its vent in Kham under 7000: in its mid-course through Utsang, a mean nearer the latter.

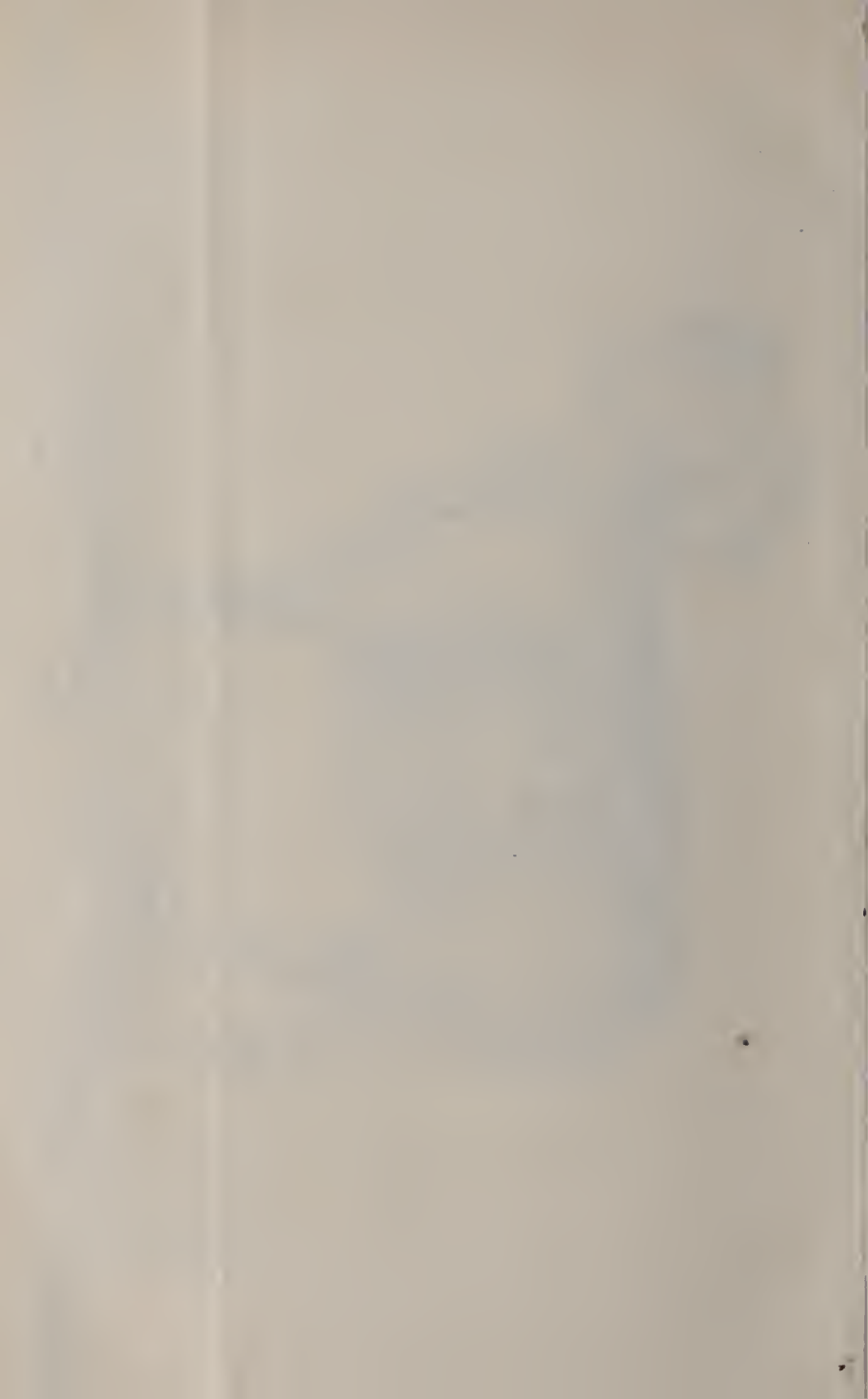


OVIS BURIAL. The Barual Sheep.





Ovis SHINGIA. SILING SHEEP OF TIBET.



Tibetan family also, and identical, I believe, with the *Serica* regio* of the classics; and, last not least, the natal soil of a fine breed of sheep which spreading thence westerly through Kham (following probably and indicating the migrations in one route of the Scythic stock of the human race) is now common in Tibet as far as Lassa and Digarchi, whence the cis-Himálays have imported a few samples, but rather as curiosities than for œconomic uses. The Silingia or sheep of Siling is nearly as common as the Húniá in Kham, but less so in Ütsang and nearly or quite unknown in Nári, where the Húniá most abounds. The Silingia is a delicate breed, both in structure and constitution, compared with the Húniá, and though it will live and procreate in the Cachar, or northern region of the sub-Himálays, it is rare there, and unknown south of it. In Nepál I procured my specimens from the Court, which imported them from Lassa: in Sikim from the Barmúkh Raja, who procured them from Kham, all parties extolling highly the unrivalled fineness of the fleece, from which the people of Siling and the Chinese located there, manufacture the Tís and Málidah, or the finest woollens known to these regions, save such as are the product of European looms. This wool has been examined by competent authority, and is declared to be of shorter staple than that of the Húniá, but suitable for combing, and worth in the market about the same price as the Húniá fleece or eight pence per pound.† Of the merits of the mutton, I cannot speak from experience. But the Tibetans and Sikimites laud the flesh as highly as they do the fleece. The animal which yields both is somewhat smaller as well as slighter make than the Húniá, but bears otherwise much resemblance to it and is possessed, like it, of all the essential characters of the genus, which characters, having been once explained fully, need not be repeated. Length from snout to vent $3\frac{1}{2}$ to $3\frac{3}{4}$ feet. Height 2 to $2\frac{1}{4}$ feet. Head to occiput (straight) $9\frac{1}{2}$ to 10 inches. Ears 4 to $4\frac{1}{2}$. Tail only $4\frac{1}{2}$ to 5. Tail and wool, 6. Girth behind shoulder $2\frac{1}{4}$ to $2\frac{1}{2}$ feet. Horns by the curve $1\frac{1}{2}$ feet. Their

* I have read with pleasure and profit Mr. Taylor's dissertation on the country of the Seres. But I still retain decidedly my former opinion, that the *Serica* or *Sinica* regio is Siling vel Sining vel Sering, inclusive of Kham, a country of great productiveness, greater trade (transit) and ancient and high celebrity, open to China by the Hoangho, to India by the Sanpu, and to western Asia and Europe by all the plateau of high Asia.

† See Journal Agri. Society loco citato.

basal girth $6\frac{1}{2}$ to $7\frac{1}{2}$ inches. The Silingia is a breed of medium size and delicate form, with head and horns and general aspect much assimilated to the Húniá. Head moderate-sized with nose considerably but not excessively arched, and somewhat slender, trigonal, compressed and wrinkled horns, curving circularly to the sides, but less tensely than in the Húniá, and the flat smooth points reverted backwards and upwards. In this breed there is even less departure from the primitive type as seen in the Argalis than there is in the Húniá; but the more lengthened ears are pendant entirely as in the latter, and the deer-like tail likewise is somewhat longer than in the wild type, being similar to that of the Húniá. The eye, feet, and groin pits, are all forthcoming and as conspicuously as in the Argalis or in the Húniá. The colour is usually white but sometimes tinged with fawn, especially upon the face and limbs; and black is perhaps less rare as a colour in this breed than in the last. The females of the Silingia are commonly horned, though hornless females are often met with. Great intestines 17 feet, small $55=72$. Cæcum 9 inches long by 3 wide. Width of small gut $\frac{5}{8}$ inch. Of large $\frac{3}{4}$. The tame sheep of Tibet (the Húniá and Silingia) rut in winter and produce young in summer, the females gestating $5\frac{1}{3}$ months. They breed but once a year and produce ordinarily one young at a birth, but frequently two. Their periods of puberty and of longevity have nothing peculiar or different from what is well known of other breeds in other realms.

3. *Ovis Barwál*.—The Barwál. This is a cis-Himálayan breed and the ordinary sheep of the Cachar or northern region of the sub-Himálayas* where immense flocks are reared by the Gúrúng tribe, in all the tracts between Júmá and Kiránt. The breed extends, as I know, from Kumaoon to Sikim, and, as I conjecture, still further beyond these western and eastern limits. The Barwál is especially the breed of the northern region of the cis-Himálayas; and though its strength of constitution enables it to live pretty well in the central region, yet it is seldom bred there, and never in the southern region of the Hills, nor in the plains of India, the heat of which it probably could not endure. The Barwál is the “hero of a hundred fights,” his high courage, vigorous frame, superior size and enormous horns covering and shielding his entire forehead, rendering him more than a match for any foreign

* Bhote purganals of Traill apud Trans. Asiatic Society.

or indigenous breed of sheep, and a terror even to the bulls. The Barwál in measures of extent, that is, in length and height, is inferior to the Húniá, but superior to that breed in massiveness of entire structure and in weight, and upon the whole, equal in size. Length from snout to vent $3\frac{3}{4}$ to 4 feet. Height $2\frac{1}{2}$ to $2\frac{3}{4}$ feet. Head, to joint of occiput, 11 inches of straight measure, 14 by the curve. Ears 2 to 3 inches. Tail only 7 inches. Tail and wool, 8 inches. Girth behind the shoulder $3\frac{1}{4}$ to $3\frac{1}{2}$ feet. Length of horns, along the curve, $2\frac{1}{2}$ feet. Their basal girth 13 to 14 inches.

The Barwál is singularly remarkable for his massive horns, huge Roman nose and small truncated ears. But this breed, like all the others, possesses without exception all the characteristic marks of the genus, as above defined, and none others denied to that genus, whilst the extraordinary massiveness of its horns, though a deviation from the other tame races, is a normal approximation to the wild type, leaving the high curve of the nasals or chaffron as the only anomaly of the Barwál breed in comparison with its wild prototype, and an anomaly of which the other tame races exhibit marked, though not equal, degrees. The head is large, with a small golden brown eye, a horizontal tiny and truncate ear, pressed down in the old males, by the horn, and seeming as if the end were cut off, a Roman nose such as the Iron Duke might envy, narrow oblique nostrils, showing some faint symptoms of the nude muzzle in the manner of the wild Argalis of Tibet, a short thick neck, a compact deep barrel, rather elevated strong, and perpendicular limbs supported on high short hoofs, and having largish and salient conical false hoofs, behind them, and lastly a short deer-like tail, cylindric conic, almost entirely nude below, and reaching to about the middle of the buttock.

Both sexes have horns, not a tythe of the females being void of them, and the males scarcely ever without them. The horns are inserted without obliquity, and in contact on the crest of the frontals or top of the head which they entirely cover, and they are directed to the sides with a more or less tense and perfect circular curve, which is sometimes in old age repeated on a smaller scale; but ordinarily the spherical twist is single and leaves the flattened smooth tips of the horns directed outwards and forwards. The form of the horns is trigonal and compressed, as in the other tame and in the wild breeds; and as in the

latter especially, presents a broad surface to the front. There is less compression in the Barwál than even in the wild sheep, so that sometimes, but not usually, the breadth is in excess of the depth at the bases of the horns. The frontal aspect of the horns in the Barwál is, however, always ample, if not quite equal to the lateral aspects, and the three faces, though, in general, flat, have more or less of curvature which is usually convexed, but sometimes rather concaved on the inner lateral aspect : and the cross furrows or wrinkles of the Barwál's horns are as decided and heavy as in its wild prototype. The flesh and fleece are both very abundant but coarse, well suited to the wants of the lusty, rude and unshackled population of the Cachar, but not adapted probably for foreign exportation or exotic rearing. By far the largest number of the Ráhris or coarse blankets and serges, manufactured in the sub-Himálayas, and extensively exported therefrom for native use, in the plains of India, are made from the wool of the Barwál, which, likewise, entirely and exclusively clothes the tribes who rear it, and make the rearing of it their chief and almost sole occupation. The Gúrúngs especially are a truly shepherd, though not a nomadic, race, and they, it is principally, who breed the Barwál, feeding their immense flocks nearer the snows in the hot weather, and further off the snows in the cold weather, but never quitting their own proper habitat as well as that of their flocks, and which is the northern division of the sub-Himálayas. Coarse as is the wool of the Barwál, it is very superior to that of the sheep of the Indian plains, and being of the long stapled kind, the animal might possibly prove a valuable addition to our European stores, either for the wool or for the flesh market, the Barwál being of a hardy constitution, averse only from excessive heat, and feeding and fattening most kindly. The colour of this breed is almost invariably white : but reddish or tan legs and face are sometimes found, and it may even be said '*Rara Ovis in terris, nigroque simillima*,' of this as of the other breeds.

The seasons of rutting and breeding are winter and summer respectively : the gestation is of $5\frac{1}{2}$ months, and but once a year, pampering and high feeding alone ever causing two broods in the year, or deviation from the customary times of female amateness and of delivery, though the male be toujours prêt et beaucoup suffisant pour une troupe des dames.*

* This extreme sexual energy is sustained by proportionate organic development. I do not see how we are to reconcile it with the "fitness of things," unless many more females than males are produced.

The feet, groin and eye pits are all conspicuous in the Barwál. Intestines 121 feet; whereof the small are 94, and the great 27 feet. Cæcum $12\frac{1}{2}$ inches long, and $3\frac{1}{2}$ wide. Several inches of the gut below it, nearly as wide. Rest $2\frac{1}{2}$ to 2 inches in diameter down to anal end. Liver with two principal and five total divisions besides the lobulus and the large gall-bladder loosely attached to the largest lobe in a very partial cleft and at its lower edge.

4. *Ovis Cágia*.—The Cágó or Cágya. This is the especial breed of the central region of the sub-Himálayas, so far as that region can be said to have a breed, for, in sooth, its very rank pasture and high temperature together are very inimical to Ovine animals. There are few sheep in the central hilly region, and none in the lower, till you reach the open plain, and there is found a widely diffused breed, quite different in its superficial characters from any of the hill ones. What sheep are reared in the central region of the hills are of the Cágia breed, but rather by householders than by shepherds, and rather for their flesh than for their wool. The Cágia is a complete Barwál in miniature: yet, like as the two breeds are, each has its own region, nor does the great difference of size ever vary or disappear. Nor are there wanting other differential marks such as the full sized pointed and pendant ears of the Cágia and its shorter stapled and finer wool.

Length from snout to vent 3 to $3\frac{1}{4}$ feet. Height 2 to $2\frac{1}{4}$ feet. Head to occiput by the curve, 13 inches, straight 10 to 11 inches. Tail only, $6\frac{1}{2}$ to 7 inches. Tail and wool, $7\frac{1}{2}$ to 8 inches. Ear $4\frac{1}{4}$ to $4\frac{1}{2}$ inches. Girth behind the shoulder $2\frac{1}{2}$ to $2\frac{3}{4}$ feet.

The Cágia is a small, stout and compact breed, possessed of great strength and soundness of constitution, impatient only of heat, and that much less so than the preceding breeds, eminently docile and tractable, affording mutton of unequalled quality, and wool not to be despised, yet to be praised with more qualification than the meat. Men of rank in Nepaul, who eat mutton, always prefer that of the Cágia, which is certainly superior both for tenderness and flavour to the mutton of any other breed of sheep in these regions. The wool is of short staple but considerable fineness, though inferior much to that of Silingia, somewhat to that of the Húniá, but superior to the wool of the Barwál in fineness, though not equal to it in length of fibre. The people of the central region of the sub-Himálayas, to which region the Cágia sheep

is confined, dress almost entirely in cottons, and consequently do not much heed the fleece of their sheep. But the Newárs of Nepal-proper, where the Cágia most abounds, manufacture its wool into several stuffs, often mixed with cotton.

These manufactures, however, are sheerly domestic, and of little consideration, the products being poor and coarse, though owing more to unskilful manufacture than to the inferiority of the raw material, none of the mountain tribes east of Cashmir, possessing any portion of that high proficiency in the art of weaving, which has for ages given such celebrity to the looms of Cashmir, as of Delhi, of Benares, of Dacca and to Guzerat.

The Cágia sheep is a handsome breed, but the head is too large, the chaffron too prominent, and the legs too short for perfect beauty. The head is large, and massive: the eye small and pale: the ears longish pointed, narrow and pendant; the body full and deep; the legs short and rigidly perpendicular but fine; the tail short and deer-like, as in all the other breeds; the nose only less romanised than in the Barwál; and the massive horns only inferior in thickness to that breed. In the Cágia the horns are trigonal, very moderately compressed, heavily wrinkled, and curved circularly to the sides with a tense flexure, the flat smooth points being usually directed outwards and upwards, but in old age sometimes recurved into a second spheroid, the points still having the same direction as in case of the single spiration. Thus the Cágia is nearly as well armed for battle as the Barwál: but he is less used in that way by the rich and idle, owing to his inferior size and courage. The beautiful lambs are the constant pets of the ladies, this breed being of all the most docile, and made almost a domestic animal by the Newárs of Nepal-proper. The Cágia is confined to the central region of the hills and extends longitudinally, or west and east, from the Naraini to the Dúdh Cosi. The colour is very generally white. Some few are black or ochreous yellow, and the young are apt to be of the last hue, turning white as they grow up. The males are almost invariably horned, and the females frequently, even generally, so; but hornless females are not uncommon. Polycerate varieties seem unknown to the Cágia as to the Barwál breed, but are common in the Huniá, heard of in the Silingia breed. And here I may observe, that I have described the whole of the sheep, and shall do the goats, from *mature*



OVIS PUCCHIA. THE HINDOSTHANI DUMBA.

and perfect males, and have found nothing to remark peculiar to the females beyond the occasional absence of horns, a circumstance invariably noticed in regard to the females; though I may add, once for all, that the females all exhibit the usual inferiority of size, and that their chaffron is always straight, how much soever it be bombed in the males, another indication, by the way, that the Roman nose is an adventitious, not essential, character of the genus. Not so the eye and feet and groin pits, which are organic and essential marks, and as such are universal, the Cágia not less than the others, tame and wild, male and female, exhibiting them all conspicuously. In the same light must be regarded the two teats, though this be a structural peculiarity of wider prevalence and less invariability, serving to assemble into one group (Capridæ) the sheep of all sorts and the goats with many of the Antelopes, yet disappearing in the Hemitragæ in the Thárs, Gorals, Chousinghas and others of the proper Antelopine family;* and, what is very remarkable, not absolutely constant even among the true and proper sheep; for I have more than once met with Cágias possessed of 4 teats.

This, however, is a point that must be referred to the category of "questions pour un ami" like the occasional 5 molars of the sheep; and the general reader may rest secure that sheep-proper have 6 molars and 2 teats.

The Cágia sheep ruts in spring and breeds in autumn, most of the young being born at the close of the rains, but without absolute constancy, for the domestic and artificial life of the Cágia leads to its often breeding irregularly throughout the year, and sometimes even twice in one year. One or two young are produced at a birth, and ordinarily in autumn, instances of two parturitions in one year being most rare. I have no memorandum of the intestines. The periods of maturity, decline and death, show nothing calling for note. Having now despatched the several races of tame sheep of the mountains and of Tibet. I might next describe with equal particularity the Tarai sheep, which seems to be identical with that found all over Gangetic provinces, and is characterised by medial size, black colour, a very coarse but true fleece, frequent absence of horns in one or both sexes, a nose romanised amply, very large drooping ears, and a long thick tail frequently passing into the monstrous Dúmba "bussel." But the extent to which

* See paper on the Ruminants, Journal Asiatic Society, above referred to.

my remarks, on the mountain races, have insensibly spread, warns me to return to the hills, and take up, without delay, the other branch of my subject, or the Alpine Goats. I shall therefore merely observe further of the long-tailed sheep of the Gangetic provinces or *Ovis Púchia*,* the *Púchia* of the natives, that its essential structure conforms entirely to the definition of the genus above given, whilst its deviations in subordinate points, (carefully noted above) from the wild and tame sheep of the mountains, distinctly prove the ultimate effects of domestication upon these animals to be, to augment exceedingly the size of the tail, in length and thickness, one or both, to increase the size and destroy the mobility of the ear, and to diminish the volume of the naturally massive horns until they gradually disappear in one or both sexes; the Romanising of the nose, out of all proportion to the “modesty of nature,” as seen in the wild state, being a further and hardly less uniform consequence of domestication, though *not* one which, like the others, seems to augment most under privation of the primitive mountainous abode of these animals, as well as of their liberty and of their consequent power, freely to indulge all their natural propensities. The general Zoology and Regne Animale,† *Anotice Dúmbas* (*Ovis scatopyga*) in Tibet; but I am well assured, there are none in any part of “high Asia,” or between the Altai and Himálaya, the Belut Tag and Péling.

Genus CAPRA.

Goats.

Horns in both sexes.

No muffle,

No eye pits.

Feet pits in the forefeet only, or none.

No inguinal pores nor glands.

No calcie tuft nor gland.

Mammæ two.

Odour intense in males.

A true beard in both sexes, or in the males only.

These animals are further distinguished by horns, directed rather upwards and backwards than circling sideways to the front, as in the

* *Púchia* equivalent exactly to *caudatus*, from *Púch*, a tail.

† Vol. II. p. 390 and IV. p. 330. The *Cabul Dúmba* is polycerate. That of the plains of India differs not from the ordinary sheep, save in the fat tail.

sheep-proper, by the obliquity of their insertion on the top of the head, their less volume, greater compression, less angularity, and, above all, by the keeled character of their sharp anteal edge. The tail of the goats is shorter and flatter than in the sheep; their chest or knees frequently bare and callous; and their hairy pelage apt to be of great and unequal lengths.

It must be remembered that the so-called wild goats of the Himá-laya (Jhálal or Tehr) are not goats at all; for they have four teats, a moist muzzle, and no interdigital pores or feet pits. Having premised this caution and solicited attention to the above essential and subordinate characters of the goats, I proceed to describe the several tame species of Tibet and of the sub-Himálayas.

1. *Capra Chánggrá*.—The Chánggrá. This is the common domestic goat of Tibet, a breed of moderate size, distinguished by the uniform abundance of its long flowing straight hair, which descends below the knees, and hocks, and covers pretty uniformly the whole animal. Even the legs are abundantly provided with hair, though, of course, it is shorter there than on the body, whilst the head, with its ample forelock and beard, worthy of the Shah of the Persia, shows the same tendency to copious development of pelage in this animal, which has likewise a spare sub-fleece of exceedingly fine wool. Length from snout to vent about 4 feet. Mean height 2 feet. Head to occiput, by the curve, 11 to 12 inches, straight 9 to 10 inches. Ears 5 to 6 inches. Tail only, $4\frac{1}{2}$ to $4\frac{3}{4}$. Tail and hair, 9 to 10 inches. Girth behind the shoulder, $2\frac{1}{2}$ to $2\frac{3}{4}$ feet. Horns along the curve, $1\frac{1}{4}$ to $1\frac{1}{2}$ feet. Basal girth of horns, 6 to 7 inches. The Chánggrá has all the independence of physiognomy and boldness of carriage; but not, perhaps, all the hardihood of the constitution, which Buffon has attributed to the whole race of goats. He is wanton, capricious, restless, impatient of strict restraint, and of docility far inferior to that of the sheep, though better able to endure change of climate, his gay roving eye bespeaking his mercurial temperament, and any attempt to handle him demonstrating his impatience of all but lax control. Ordinarily he is tractable enough; but he will not submit, like his countryman the Húniá, to carry burdens; and he may be bred and herded with facility; but he requires a large range and liberty to please himself whilst grazing.

In the dry cold plains of Tibet, which are every where varied by hills and broken ground, the Chánggrá flourishes exceedingly, and also in the northern region of the cis-Himálayan mountains. He will not only live but breed in the central region of the sub-Himálayas; and with extreme care may be kept alive, but not bred, in the southern region of the hills, and even in the plains. But he merely exists in the two last named locations, and even in the central region of the mountains, he loses the fine silky sub-fleece, retaining the external hairy pelage only, and that much shorn of its "fair proportions." A Kirghis breed allied to the Chánggrá, has been conveyed safely to Europe, and bred there successfully in the alpine parts of southern France; and, as both this and the Chánggrá are closely allied to the celebrated shawl goat, I have no doubt that either their exquisite sub-fleece or their abundant outer coat could be turned to good account, if not immediately yet after crossing the breed with some nearer appropriate stock such as the Angola or Whidah. The natives of Tibet manufacture ropes, caps, and coarse overalls out of the long hair, and a fine woollen cloth called Tús, out of the sub-fleece, mixed occasionally with the wool of the Silingia sheep. The flesh of the Chánggrá, especially of the kids, is excellent, and is much eaten by the Tibetans and cis-Himálayans, even the Hindús of the central region, importing large numbers for food and sacrifices, especially at the Dasahara, or great autumnal festival. But upon the whole, the Tibetans prefer the mutton of their sheep to that of their goats; and the former are consequently much more abundant in Tibet, and yet more so in the cis-Himálayan district of the Káchár, where alone, on this side the snows, goats or sheep flourish.

The Chánggrá, as I have said, is a breed of medial size, with a fine small head full of expression, a spare and short neck, a long yet full body, short rigid limbs, and a short deer-like tail, rather shorter, more depressed and more nearly nude below, than in the sheep, and frequently carried more or less elevated especially in the males. The narrow oblique muzzle is covered with hair: the longish face and nose quite straight: the short forehead, arched both lengthwise and across, and furnished with an ample forelock: the small brownish yellow and saucy eye placed high up or near the base of the horns. The horns, which are inserted very obliquely on the top of the head, are in contact

with their anteal sharp edges, but diverge towards their rounded postéal faces, and curve upwards, outwards and backwards, with much divergency and with one lax spiral twist, leaving the flat smooth points directed upwards and backwards. The compression of the horns is great, so that their basal section is elliptic or rather acute conoid, and the keel is neither very distinctly separated from the body of the horns, nor does it exhibit any salient knots, but is rather blended into the lateral surfaces, and chiefly indicated by the deflexion of the wrinkles of the horns, which are numerous and crowded but not heavy, and go pretty uniformly round the horns, but form a decided angle at the commencement of the keel. The ears are longish, narrow, obtusely pointed and pendant, with very little mobility. The short strong rigid limbs are supported on high vertical hoofs, and have obtusely conic false hoofs, pretty amply developed behind them. The essential structure in these animals is perfectly conformable to the type of the genus as above defined. That is to say, they have hairy noses void of muffle; horns common to both sexes; no trace of gland or of pit below the eye or in the groin; small feet, pits confined to the fore extremities but they are distinctly marked and invariable. No gland nor tuft on the stifle; odour intense in the males; a true beard, proper to both sexes, and invariably forthcoming callosities on the knees; and, lastly, horns inserted like those of sheep on the top of the head, but cultrated to the front, not to the rear, much more obliquely set on the head, more compressed, less angular, and showing palpable evidence of the keel in that particualar form which it exhibits in *Cægagrus*,—the true wild type of *Capra* or the goats proper; whereas *Ibex* is a distinct type analogous to the *Mouflons* or *Caprovis*.* In the *Chángrás* there is, in fact, hardly any deviation from the wild type, except in the large and pendant ears; so that domestication would seem to have made less impression on these animals than on the sheep, though its effects on both groups have been less oblitative than is generally supposed; and it will be seen in the sequel, that all the tame Goats of these regions conform to their assumed wild prototype, with hardly less deviation than is seen in the above careful survey of the *Chángrá*.

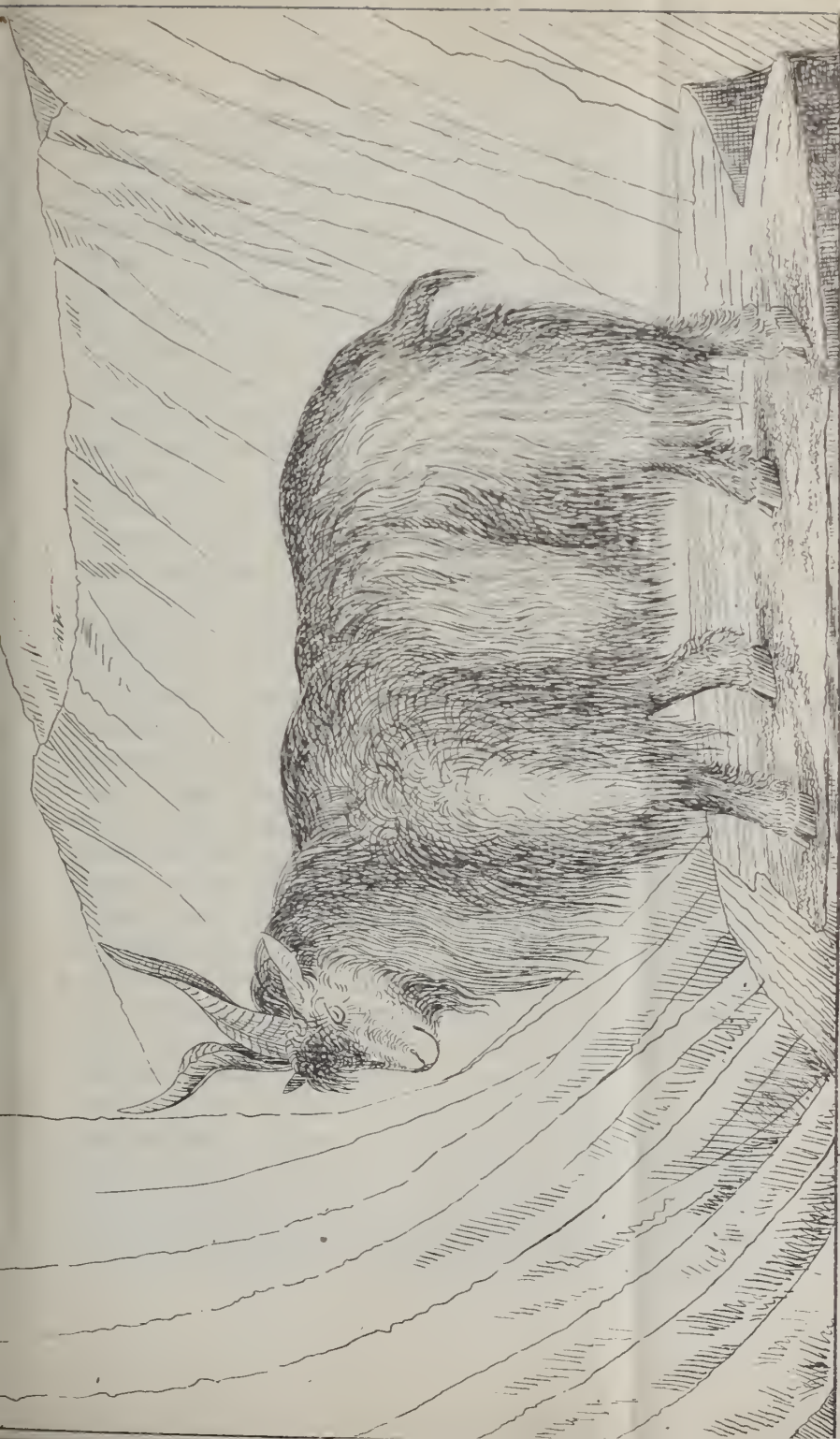
The females of the *Chángrá* are smaller than the males, and have

* See paper before adverted to in *Journal Asiatic Society*.

smaller horns nearly void of spiral flexure. But they are bearded, like the males, and otherwise entirely resemble them. The rutting season is early winter: the period of procreation, early summer: and the gestation of about $5\frac{1}{2}$ months, or some 10 days beyond the fifth month, as in the sheep.* One, two, very rarely three, young are produced at a birth. The females begin to breed in the first year of their age: the males to procreate in their second year. They are at their best at 8, old at 10, decrepid at 15, and seldom live beyond 15 to 20 years. I have no memorandum of their intestines. Perhaps the most general colour of the Chánggrá is white, tinged with slaty blue. But the white is seldom unmixed, and the limbs and sides of the head are apt to be dark. There are frequent dark patches on the body, and often the whole body is black or tan, the limbs only and face being white.

2. *Capra Chápú*.—The Chyápú and Chápú of the northern region of the sub-Himálayas. This breed bears the same relation to the Chánggrá as the Cágía sheep to the Barwál, that is, it is invariably of much smaller size than the Chánggrá, and has a different habitat, with great general similarity of structure and appearance, yet not wanting points of diversity. The ears of the Chyápú are invariably smaller, and less pendant than those of the Chánggrá; and what is very deserving of attention the feet pits are not constant in the Chyápú, but are occasionally wanting, as in the Dúgú, a species presently to be described. In the majority of the goats of these regions, the feet pits are present in the anteal extremities without variation: but they are sometimes wholly wanting in all 4 feet of the Chyápú and Sínál; frequently so in all 4 of the Dúgú; and hence we may learn that this mark is more normal in the sheep than in the goats, and that it has a strong tendency to obliteration in the latter. The Chyápú is further distinguished from the Chánggrá by the very various flexure of the horns of the former, which are sometimes erect and sometimes curved backwards in the sickle style; sometimes spirally twisted and sometimes not so; and, again, the ears of the Chyápú, always short as compared with those of the Chánggrá, are occasionally so in the extreme, bearing the truncated appearance of the same organs in the Barwál.

* I have taken all possible pains to determine this point, and am fully aware that the statement of the text conflicts with received opinions.



CAPRA CHAPU. THE CHYAPU GOAT.



Lastly, the Chyápú is neither so frequently nor so much coloured as the Chánggrá. The Chyápú is a small breed, fully a $\frac{1}{3}$ less than the Chánggrá. It measures from snout to vent 3 to $3\frac{1}{2}$ feet, and has a medium height of $1\frac{1}{2}$ to $1\frac{3}{4}$ feet. Head straight, $7\frac{1}{2}$ inches or 10 by the curve. Tail without the hair, $3\frac{1}{2}$: with it, $6\frac{1}{2}$ inches. Ears 3 to 4 inches. Girth behind the shoulder 2 feet. Horns by the curve $1\frac{1}{2}$ to $1\frac{3}{4}$ feet. Their basal girth, 6 inches. Weight of the animal 70 to 80 lbs.

The long hair and fine sub-fleece, the ample forelock and beard common to both sexes, the sexes both horned, the invariable absence of the eye and groin pits, the feet pits present in fore feet only, the long straight face, short arched forehead, keen and sane eye, short spare neck, long full body, low rigid limbs, short high hoofs, conic obtuse false hoofs, and short depressed tail; and, lastly, the invariable two teats, are marks alike of the Chánggrá and Chyápú. But the gay and independant look of both is augmented in the lesser breed by the finer and more mobile ear, which has all the mobility of the wild state, and is now horizontal, now erect, now forward, and anon backward, as each internal impulse or external signal may prompt.

The horns of the Chyápú, as of the Chánggrá, have all the normal characters of the genus, that is, they are inserted obliquely on the top of the head, in contact; and are directed chiefly upwards and backwards. They are keeled, sharpened to the front, widened to the back, and much more compressed than in the Chánggrá, and have a long ovoid section, and their transverse wrinkling is not nodose nor heavy nor distant, but slight and crowded, going all round pretty equally. The females are not much less than the males, nor are their horns very materially less, nor different in form. The prevalent colour is white; but some are mottled or blotched with black or with tan; and the belly and limbs and a lateral mark down the head from horns to nostrils, are often dark. So too are the ears; whilst the prevalent white colour is frequently flavescent and straw tinged.

The Chápús rut in winter and procreate in spring, gestating somewhat more than 5 months or about 160 days; and with regard to maturity, senility and death, they show little or no difference from the Chánggrás. They are of strong constitutions and hardy habits, but love cold and short aromatic pastures, and as these can be found only in the Cachar region of the cis-Himálayan mountains, to it the Chyá-

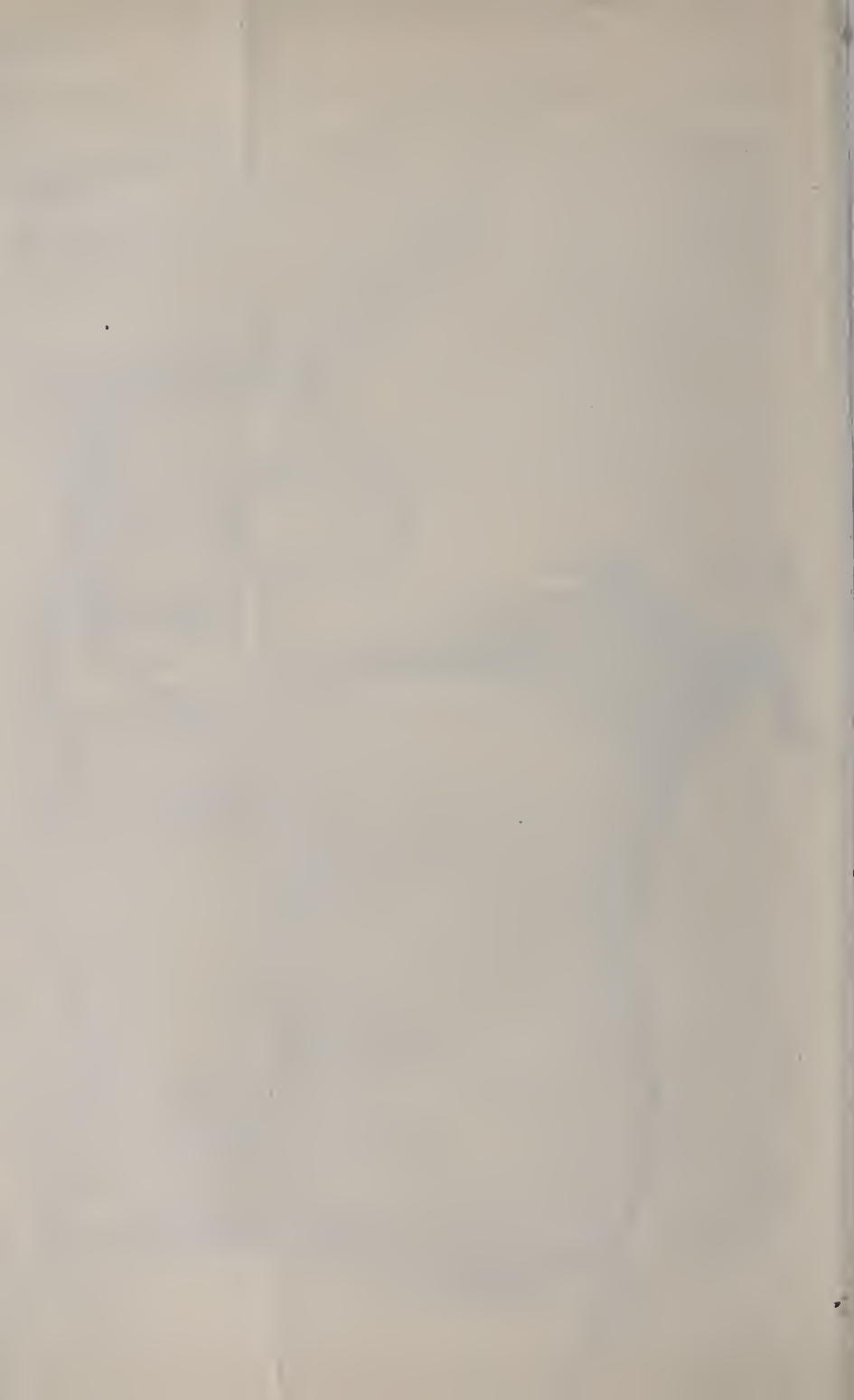
pús may be said to be confined, the immense numbers of them are imported into the central hilly region during the cold months to satisfy the flesh-loving habits of the people of that region, who also occasionally weave the long hair and fine wool of the Chyápú into appropriate manufactures, as do the Magars, Rongbos and Gúrúngs of the Cachár; and in an æconomic point of view, I apprehend, that the Chyápú not less than the Chánggrá is an object well deserving the attention of all those who aspire to benefit their kind or themselves by multiplying the resources and materials of our stupendous manufacturing system.

The Chánggrá and Chyápú would flourish wonderfully in the driest of our hilly counties, in Wales, England or Scotland; and the sample of Cashmeri workmanship out of the inner fleece of the Chánggrá which I sent to a great house in Lancashire, was declared to be a marvel of beauty.

3. *Capra Sinál*.—The Sinál or Sinjál of the Cachar. This large and finely proportioned breed is the especial race of the Cachar, where the Chyápú, though now abounding, is, no doubt a not very remote immigrant from Tibet. But the Sinál now is, and has been for ages, proper to the more northern parts of the sub-Himálayas, including the whole of the northern region and a small part of the central region. In these latitudes the Sinál abounds from the Kali to the Trisul or from Kumoon to Nepal proper; and probably beyond these limits, both west and east, though I know it not. The Magars, Gúrúngs, and Khas too, rear the Sinál, whose ample hairy surcoat and fine sub-fleece, though both inferior to those of the Chánggrá and Chyápú, are yet capable of being, and actually are, applied to the manufacture of ropes and of blankets, serges and caps, and only not more efficiently turned to æconomic uses, because the Gúrúngs alone of the above named tribes are wise enough not to affect contempt for arts mechanical; for all arts, in short, but the glorious one of war! The Sinál measures from snout to vent 4 to $4\frac{1}{4}$ feet and $2\frac{1}{4}$ to $2\frac{1}{2}$ feet high. Its head is by straight measure $9\frac{1}{2}$ to $10\frac{1}{4}$ inches, and by curve 12 to 13. Ears 6 to $6\frac{1}{2}$ inches. Tail only, $5\frac{1}{2}$ to 6. Tail and hair, 10 to 11 inches. Horns by curve $1\frac{1}{4}$ to $1\frac{1}{2}$ feet. Basal girth 5 to 7 inches. Girth of the animal behind the shoulder $2\frac{3}{4}$ to 3 feet. The Sinál is a perfectly typical goat, even more so than the Chánggrá, having the horns less excessively compressed and the keel more distinct. The long face is straight.



CAPRA SINAI. THE SINAI GOAT, MALE AND FEMALE.



The short forehead arched. The oblique small muzzle quite hairy and dry. The small pale eye void of any trace of eye pits below it. The largish narrow and pointed ears quite pendant. The moderately compressed horns set on with the full usual obliquity on the top of the head and in contact at their sharp keeled anterior edge, but separate and rounded behind, with an ovoid section and medial uniform wrinkling that is carried $\frac{2}{3}$ towards the flat smooth tips. The direction of the horns is upwards and outwards with great divergency for a goat, and a single lax spiral turn leaving the points directed upwards and a little backwards. The neck is spare. The body long yet compact. The limbs sufficiently elevated, stout and rigid, and like the body, though of course in less degree, showing all the usual tendency to excessive-hairiness. The hoofs short, high, with rigid pasterns and large conic false hoofs. Feet pits in fore feet only or in neither: and medial conico-depressed tail carried curvately erected by the males who, as well as the females, have an ample beard and a moderate forelock. Teats two, as in all the rest. Females smaller but horned; the horns smaller and scarcely spirated. Colours white, or black, or brown, with white or fawn face and limbs; pure white being rarer than in any of the foregoing by much. The Sinál is seldom seen out of his own district, being perhaps less patient of change than the Chánggrá or Chiyápú, and for foreign exportation inferior to either of them, as well owing to this inferior hardihood, as to the smaller quantity and coarser quality of the fine sub-fleece. The mutton is good and the flesh of the kids greatly and justly prized, being far superior to that of lambs of any breed; and the milk also, like that of the other goats, is greatly and justly esteemed. The Sináls rut in autumn and procreate in spring, the females gestating upwards of 5 months, as I am positively assured, and as is true of the Ibexes, but not supposed to be so of the *Ægagri* or of the tame goats.*

Intestines 72 feet whereof the small are 53 and the great 19 feet. Cæcum 12 inches long by 3 wide. Great gut near it 2 inches wide. Another male. Intestines 78 feet, whereof small 59, and great 19 feet.

* See and compare general Zoology II. p. 373 and English Regnè Animal IV. pp. 298 and 301. That points like this should be subject to doubt may show the ordinary observer how much he has it in his power to do by merely using his opportunities of observation in India.

Cæcum 12 inches by 3. Knees and chest nude and callous. Sub-fleece frequently wanting. Almost always so in summer.

4. *Capra Dúgú*.—The Dúgú. This is the Goat of the central region of the sub-Himálayas. But the remark applied to this region in reference to the sheep holds almost equally good as to the goats. In fact the central and lower regions of the sub-Himálayas are unsuited to goats or sheep owing to their rank pasture, excessive moisture and enormous superabundance of leeches and other parasitic creatures generated by heat and moisture amid a luxuriant vegetation. The Dúgú is bred only in small numbers by householders—and only for home consumption of the milk and flesh, both of which are excellent and eagerly consumed by the highest castes. The Dúgú extremely resembles, and is probably identical with, the ordinary domestic goat of the lower provinces, that of the upper provinces—viz. the large gaunt Roman-nosed, monstrous-eared Jamnapári—being unknown to these mountains, and unable to endure their climate in any part. The Jamnapári (*Capra Jamnapária*) becomes in the mountains goitrous, casts its young prematurely, breeds not, and hardly exists. But the little goat of moist Bengal does very well in the moist climate of the central and lower hills; and accordingly, I believe, that as the upper region of the hills is indebted to Tibet for its goats, so the central and lower regions are indebted to Bengal and Behar for theirs,* and that the animal we are now to describe is at least, in origin, the common domestic Goat of the Gangetic provinces, from Allahabad to Calcutta nearly.

The Dúgú of the central or lower regions of the hills is distinguished from all the breeds of Tibet and of the Cachar by the frequent absence, in the females particularly, of the long hair, and the nearly as frequent absence of the interdigital pits, belonging to those races or breeds. The males however of the Dúgú breed are often as shaggy as the Chánggrá or Sinál; whilst in the latter species, as we have seen, the feet pits are not invariable. Upon the whole, “feet pits in the fore feet only or none” seems to be the proper generic formula quoad this organ; whilst long or short hair can be admitted only as a very subordinate character; and with those exceptions, the Dúgú is thoroughly

* F. Cuvier's notices of Nepalese goats are altogether apocryphal, though copied and de la lettre by the English Editors of the *Regnè Animal and Natural Library*. The exotics of the Residency have become Nepal species, and the poor Jamnapari which we tried so vainly to acclimatise, figures as the Nepaul Goat!!!

conformable both in essential and in subordinate points to the characters we have called generic, and as such placed at the head of our paper; so that, as has been already remarked, domestication would seem to have produced much less impression on the primitive goat, as typed by *Oegagrus* than on the primitive sheep as typed by *Ammion*.

The *Dágú* measures from snout to rump $3\frac{3}{4}$ to 4 feet and about 2 feet in height. Head by the curve 11 to $11\frac{1}{2}$, straight 9 to 10 inches. Tail only 5. Tail and hair $8\frac{1}{2}$. Ears $5\frac{1}{2}$ to 6 inches. Horns by curve 14 to 16. Their Basal periphery 6 to 7. Girth of chest 2 to $2\frac{1}{4}$ feet. The *Dágú* is of medial size and well proportioned, the male being much larger than the female, and frequently shaggy, whilst she is always smooth. There is no sub-fleece and the hair is coarse and turned to no use, the skin only being of value when the flesh is disposed of, and the skin but rarely and unskilfully turned to use. The muzzle of the *Dágú* is dry and hairy: the face unarched: the forehead considerably so: the ears largish and horizontal or pendant: the moderate horns turn up simply backwards, without spiral twist and with but a vague keel, though it be traceable enough in the antea sharp edge: the neck spare: the body longish yet full: the rigid limbs nor short nor long, with high short hoofs and conic false hoofs: and, lastly, medial tail, depressed and nude below and curvately raised in the males. The eye pits and muffle and groin pits are as invariably absent as in the other breeds; and the feet pits more frequently wanting than in any. The beard is ample in both sexes, and the females always have horns and two teats; and their hair is close and smooth. Intestines 93-7, whereof the small are 70 and the great 23 feet 7 inches. Cæcum 13 inches by 4. Another 108 feet, whereof small are 82, and great 26 feet, and the Cæcum 3 feet! The *Dágú* breeds all the year round, but most young are produced at the close of the rains in autumn, being begotten in spring. Two are frequent at a birth, and two births in a year have been heard of; but most rarely, and well may be so, if it be true, as insisted on to me, that this breed likewise gestates above 5 months or 160 days.*

And now, before concluding this long paper, I will take leave to remark, that the facts so carefully amassed, the fruit of years of patient

* For the period of Caprial gestation see Penny Magazine sub voce, as well as the General Zoology and Règne Animal as quoted supra.

observation, should serve, not merely to illustrate the essential characters of two groups of animals heretofore ill discriminated, but should also throw much light on those interesting questions, the effects of domestication and of climate upon the natural organisation, and the natural habits and range of species, subjects of high interest, no doubt, though a degree of ridicule has been cast upon them by the pompous dissertations of those who were at as little pains accurately to determine the geographical as the Zoological data disserted upon.

*Illustrations.**

1. The Silingia Sheep.
2. The Barwál Sheep.
3. The Cágíá Sheep.
4. The Dúmba variety of the Púchiá Sheep or of common breed of Gangetic provinces.
5. The Chyápú Goat.
6. The Sinál Goat.
7. Feet pits of sheep and of goats, and heads of Barwál and Silingia Sheep.

All figured for the first time and from nature.

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CATALOGUE OF REPTILES

*Inhabiting the MALAYAN PENINSULA and ISLANDS,*

*Collected or observed by THEODORE CANTOR, Esq., M. D., Bengal.  
Medical Service.*

(Concluded from No. CLXXXI.)

—

VENOMOUS SERPENTS.

FAM. VIPERIDÆ, BONAPARTE.

SUB-FAM. BUNGARINÆ, Bonaparte.

TERRESTRIAL.

GEN. ELAPS, *Schneider.*

Head more or less indistinct, neck not dilatable; mouth and eyes small, trunk elongated, throughout of nearly equal circumference, very smooth; tail short, tapering, beneath with scutella.

\* For the accompanying illustrations the Editors are indebted to the liberality of James Hume, Esq., at whose lithographic press they were executed.—Eps.





## ELAPS INTESTINALIS,\* (Laurenti,) VAR.

SYN.—*Maticora lineata*, Gray; Ill. Ind. Zool.*Elaps furcatus*, Schneider, Var. apud Schlegel, Cantor.

*Young and Adult*.—Head above light chestnut; lips and throat yellowish white, upper lips spotted with black; from the hindhead to the tip of the tail a vermilion line, on each side of which a narrow, serrated, black line. On the nearest two longitudinal series of scales the ground colour appears as a reddish light grey longitudinal line, beneath bordered by an equally broad black line, under which a narrow buff-coloured line, bordered by a black serrated line, the teeth of which are directed downwards, wedged in between the lateral margins of the scuta and scutella. Scuta alternately pale citrine and iridescent black, the latter colour occupying three to four scuta together, while the former rarely appears on more than two. Tail above with two or three distant black transversal bands; beneath vermilion, with a continuation of the superior transversal bands. Iris black, pupil circular; tongue black.

Scuta 223 to 238; Scutella 24 to 26.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

Sumatra.

Excepting the colours, this variety otherwise perfectly agrees with *E. intestinalis*. The neck is covered by 15, the rest of the trunk by 13 longitudinal series of smooth, not imbricate rhombic scales. It is of no uncommon occurrence in the hills of Pinang, at Malacca, and at Singapore. The largest individual was of the following dimensions:

|                               |                                    |
|-------------------------------|------------------------------------|
| Length of the head, . . . . . | 0 ft. 0 $\frac{3}{8}$ inch.        |
| Ditto ditto trunk, . . . . .  | 1 10                               |
| Ditto ditto tail, . . . . .   | 0 1 $\frac{4}{8}$                  |
|                               | <hr/> 1 ft. 11 $\frac{7}{8}$ inch. |

Circumference of the trunk 1 $\frac{2}{8}$  inch.

\* SYN. Seba II, Pl. 2, Fig. 7.—*Aspis intestinalis*, Laurenti.—*Coluber intestinalis*, Gmelin.—Russell II, Pl. 19.—*Elaps furcatus*, Schneider.—*Coluber intestinalis*, Shaw.—*Vipera furcata*, Daudin.—*Elaps furcatus*, Schneider, apud Wagler, Schlegel.

HABIT.—Java, Malwah, (Central India.)

A collection of Reptiles, which Mr. J. W. Grant obtained from Saugor, Malwah, contained a single specimen.



## ELAPS NIGROMACULATUS, Cantor. (See Plate XL, Fig. 7.)

SYN.—*Calliophis gracilis*, Gray: Ill. Ind. Zool. (Young.)

“Probablement nouvelle espèce d’Elaps,” Schlegel: Essay, p. 451. (11)  
*Elaps nigromaculatus*, Cantor: Spicil.

Head above yellowish brown, each shield with a pale black spot in the middle; lips and throat yellowish white, spotted with pale black. Ground colour of the trunk and tail reddish light grey, longitudinally divided by a central black line with small round, black, white-edged spots about an inch apart; on each side two parallel black lines, the lower of which bordering the two lowest series of scales of the sides, which are white edged with black, so as to appear longitudinally intersected by two black lines. All the lateral black and white lines are on each side intersected by a series of large rounded (the anterior pair elongated), black spots with white edges, placed in pairs, opposite each other, but in quineunx order with the smaller black spots of the dorsal line. Beneath alternately yellowish white or pale citrine, and iridescent black, both colours nearly equally divided. Tail at the root, and near the apex with a broad transversal black band, edged with white, both continued on the vermilion lower surface, and there, between them, a third similar band. Iris black, pupil round; tongue bluish grey.

*Young*.—Marked like the adult, but the ground colour of the back and tail inclines to light reddish brown.

Scuta 238 to 311; Scutella 21 to 28.

HABIT.—*Pinang, Singapore.*

In general appearance this species very closely resembles *Elaps intestinalis*, from which it is distinguished by the following characters.\* The two pairs of frontal shields are remarkably disproportionate, the frontals (proper) being much the larger: next to the occipitals they are the largest of the crown-shields. The nearly equilateral, hexagonal vertical, and the supra-orbitals are remarkably small: more so than in any other species of this genus. The occipitals are very narrow elongated; their external margin bordered by two pairs of shields of which the anterior, the larger, covers the temples, and is beneath bounded by

\* The (magnified?) representation of the head of “*Calliophis gracilis*,” Fig. 2. Ill. Ind. Zool, is in every particular incorrect.

the fifth and sixth upper labials. The eye is sunk, excessively minute, surrounded by two small post-orbitals; beneath by the third and fourth upper labials, and by a single narrow triangular præ-orbital. The latter is placed obliquely, so that the downwards pointed apex meets the linear posterior part of the nasal, or as it is considered by some, the frenal. The nostrils are comparatively large. The upper labials number six on each side: the two posterior are the largest. The chin is covered by two pairs of elongated narrow shields, externally bordered by the third and fourth, the largest of the six inferior labials. The gular scales are more numerous than those of *E. intestinalis*. The neck is covered by 15, the trunk by 13 longitudinal series of smooth rhombic scales with rounded points. This species is of no uncommon occurrence in the hills of Pinang. The largest individual was of the following dimensions:

|                               |       |                       |
|-------------------------------|-------|-----------------------|
| Length of the head, . . . . . | 0 ft. | 0 $\frac{4}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2     | 1 $\frac{3}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | 1 $\frac{3}{8}$       |
|                               | <hr/> |                       |
|                               | 2 ft. | 3 $\frac{2}{8}$ inch. |

Circumference of the trunk, 1 inch.

#### ELAPS BIVIRGATUS,\* Kuhl, VAR.

SYN.—*Elaps flaviceps*, Cantor, Spicil.

*Elaps flaviceps*, apud J. Reinhardt: Beskrivelse, &c.

Head, lips and throat vermilion; trunk above brilliant iridescent, intense black, most of the scales partially edged with azure, not however sufficiently to produce regular network; the two lowest series of scales on each side azure, forming a continued lateral band, longitudinally divided by a white zig-zag line, produced by the scales being partially edged with white. Beneath vermilion; each scutum with two lateral, square, black spots, forming a continued black band bordering the azure. Tail above with a narrow black dorsal line; sides and scutella vermilion. Iris and tongue black.

Scuta 248 to 277; Scutella 38 to 45.

\* SYN.—*Erpetologie de Java*. Pl. 44.—*Elaps bivirgatus*, apud Schlegel.

HABIT.—Java, Sumatra.

HABIT.—*Pinang, Malayan Peninsula.*

In colours the young ones resemble the adult. The neck is covered by 15, the trunk by 13 longitudinal series of smooth rhomboidal scales. The anterior part of larynx, instead of adhering to the upper part of the membranous sheath enclosing the tongue, presents the peculiarity of being free and projecting in the mouth like a small tube.

Of four individuals observed, the three were from the hills of Pinang. The largest was of the following dimensions :

|                               |                              |
|-------------------------------|------------------------------|
| Length of the head, . . . . . | 0 ft. 0 $\frac{5}{8}$ inch.  |
| Ditto ditto trunk, . . . . .  | 2 7 $\frac{6}{8}$            |
| Ditto ditto tail, . . . . .   | 0 3 $\frac{2}{5}$            |
|                               | <hr/>                        |
|                               | 2 ft. 11 $\frac{5}{8}$ inch. |

Circumference of the trunk, 1  $\frac{4}{8}$  inch.

*Elaps intestinalis*, *Var.*, *E. nigromaculatus*, and *bivirgatus*, *Var.*, appear at Pinang exclusively to inhabit the hills at a considerable elevation, but on the Malayan Peninsula, and at Singapore they occur in the valleys. Although not numerous, they cannot be said to be of rare occurrence. They are strictly terrestrial, and have their hiding places under the roots of trees, and in the crevices of rocks. They are sluggish, awkwardly dragging their long slender bodies, and they are generally observed lying motionless, with the body thrown in many irregular folds, but not coiled. Although they are diurnal, their sight from the minuteness of the pupil, appears to be as defective as their sense of hearing, and they may be closely approached, without apparently their being aware of danger. If touched with a stick, they make a few strenuous efforts to slide away, but they soon stop, and if further pursued, they make some irregular spasmodic-like movements, but they have not been observed to bite. An adult *Elaps bivirgatus*, *Var.*, was on a single occasion seen to raise the head vertically about two inches from the ground. In captivity they refuse food and water, and die in a short time from inanition. Of a number examined, only one of the latter species had in the stomach the remains of a small serpent, the genus of which could not be determined. M. Schlegel has observed *Calamariæ* in the stomach of *Elaps intestinalis*. In the peculiar dis-

tribution of colours, in diminutive size, and in habits they resemble the genus *Calamaria*. It is solely the smallness of the mouth which renders the preceding species of *Elaps* harmless to man, as from the following it will be perceived, that their venom is as virulent as that of other venomous serpents. From the diminutive size of the venomous glands, the quantity of fluid secreted is small: scarcely more than a drop from each. It is a pellucid, colourless fluid, slightly reddening litmus paper.

After several unsuccessful attempts to make an adult *Elaps nigromaculatus* spontaneously bite a fowl, the jaws were forcibly closed over a protracted fold of the skin on the inner side of the left thigh of the bird. On account of the small gape, some difficulty was experienced in making the jaws close over the fold of the skin, and, as it appeared doubtful if the fangs had penetrated, the serpent was in a quarter of an hour compelled again to wound the fowl in the skin below the right eye. Twenty minutes after the first wound the fowl became purged, and manifested symptoms of pain in the left thigh, which was continually drawn up towards the body, although the wounds inflicted there, and below the eye, were, from the smallness of the fangs, barely visible. Twenty eight minutes after the first wound the bird commenced drooping, occasionally attempting to raise itself, and in 10 minutes more soporism occurred, interrupted by spasms of the neck, flow of saliva, and pecking the earth with the beak, while the pupil was spasmodically contracted, and alternately dilated. The latter symptoms continued during thirty minutes, when death occurred in an hour after the first wound had been inflicted. Fowls wounded by *Elaps furcatus*, *Var*, and *Elaps bivirgatus*, *Var*, expired under similar symptoms, from within an hour and twenty minutes, to upwards of three hours. The serpents which all had forcibly to be made to inflict the wounds, shortly afterwards expired, apparently from the violence to which they had been subjected.

GEN. BUNGARUS, *Daudin*.

Body elongated, slightly cylindrical; tail short; head oval, trunk and tail with a dorsal series of large hexagonal scales; the tail beneath with senta, in the middle sometimes with scutella; behind the fangs some simple maxillary teeth.

## BUNGARUS FLAVICEPS, J. Reinhardt.

*Young*.—Head and neck blood-red, with a pointed elongated black mark between the occipitals, and a short black dorsal line on the neck; the trunk black with steel-blue reflections, at the anterior part of each dorsal hexagonal scale a short longitudinal white streak; near the tail blood-red; each scale of the two lowest lateral series, white with a black spot, placed so as to produce a continued lateral, white zig-zag line; the posterior part of the sides blood-red. Lips and throat blood-red; abdomen black, posterior part as well as the tail blood-red, with a few black spots. Iris and tongue black.

Scuta abdominalia 209, Scuta sub-caudalia 16; Scutella 38.

HABIT.—*Pinang*.

Java.

M. J. Reinhardt has described the adult from an unique specimen in the Royal Museum, Copenhagen. Spirits of wine change the brilliant blood-red to a pale yellow colour. The diagnosis must therefore be altered accordingly. The adult appears to differ from the young, in having none of the black marks of the head and tail, and no lateral white line.

A single young individual, found by Sir William Norris, on the Great Hill of Pinang, was of the following dimensions:

|                               |       |                       |
|-------------------------------|-------|-----------------------|
| Length of the head, . . . . . | 0 ft. | 0 $\frac{5}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 1     | 4 $\frac{4}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | 3                     |
|                               | <hr/> |                       |
|                               | 1 ft. | 8 $\frac{1}{8}$ inch. |

Circumference of the neck 1, of the trunk 1 $\frac{2}{8}$ , of the root of the tail  $\frac{5}{8}$  inch.

The centre of the back forms a ridge, from whence the sides slope; the abdomen is broad, slightly arched, so that the vertical section of the body becomes broad triangular. The neck is covered by 15, the trunk by 13 longitudinal series of smooth, imbricate, rhomboidal scales. As observed by M. J. Reinhardt, the correspondence of colours, and their distribution, between this species and *Elaps bivirgatus* is very striking. Besides, the number of series of scales, is another character, approximating this species to the genus *Elaps*.



## BUNGARUS CANDIDUS, (Linné.)

SYN.—Seba II, T. 66, Figs. 3 and 4.

Coluber candidus, Linné.

Russell I, Pl. 1. Paragoodoo.

Russell II, Pl. 31. Sew Walaley.

Pseudoboa cœrulea, Schneider.

Boa lineata, Shaw.

Bungarus cœruleus, Daudin.

Bungarus semifasciatus, Kuhl.

Aspidoelion semifasciatum, Wagler.

Bungarus semifasciatus, Schlegel.

Above black with steel blue reflections, interrupted by numerous narrow transversal white bands, produced by the white edges of the scales. On each side the bands are bifurcated, and the two or three lowest series of scales, white with black spots. Lips and throat white; abdominal surface yellowish white. Iris black; tongue white.

Scuta 201 to 221; Scuta sub-caudalia 38 to 56.

HABIT.—*Malayan Peninsula.*

Java, Tenasserim, Bengal, Assam, Coromandel, Ceylon, Malabar.

A single young individual, killed by Capt. Congalton near Keddah, was of the following dimensions:

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | 1 inch.              |
| Ditto ditto trunk, . . . . .  | 2     | $3\frac{6}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $4\frac{5}{8}$       |
|                               | <hr/> |                      |
|                               | 2 ft. | $9\frac{3}{8}$ inch. |

Circumference of the neck  $1\frac{6}{8}$ , of the trunk 2, of the root of the tail  $1\frac{1}{8}$  inch.

Assam produces also a constant variety (*B. lividus*, Cantor) of a uniform blue black above; beneath yellowish white: in some the scuta blackish with white edges. In the very young the head is white with a black line between the occipital shields. It farther differs in having the hexagonal scales smaller, less distinct from the rest, and the tail more robust than the normal individuals.

## BUNGARUS FASCIATUS, (Schneider.)

SYN.—Scheuchzer, Pl. 655, Fig. 8.

Seba II, Pl. 58, Fig. 2.

Russell I, Pl. 3. Bungarum Pamah.

Pseudoboa fasciata, Schneider.

Boa fasciata, Shaw.



*Bungarus annularis*, Daudin.  
*Aspidoclonion*, Wagler.  
*Bungarus annularis*, Schlegel.

Ground colour bright gamboge; the anterior half of the head, and the cheeks black with steel blue reflections; from the vertical shield a black longitudinal band, expanding over the neck and sides, and with the former forming a broad arrow mark; lips and throat gamboge, upper lips edged with black; the rest of the body completely surrounded by a number of broad, alternate gamboge and shining black, rings. Iris black; tongue flesh-coloured.

Scuta 200 to 233, Scuta abdominalia 32 to 36.

HABIT.—*Pinang, Malayan Peninsula.*

Java, Tenasserim, Bengal, Coromandel.

The neck is covered by 17, the trunk by 15 longitudinal series of smooth scales, which with the exception of the dorsal hexagonal series, are imbricate, rhombic. As noted under *Elaps bivirgatus*, *Var.*, the larynx is not attached to the scabbard of the tongue. Of three young individuals from the valley of Pinang and Province Wellesley, the largest was of the following dimensions:

|                               |       |                        |
|-------------------------------|-------|------------------------|
| Length of the head, . . . . . | 0 ft. | 1 $\frac{2}{8}$ inch.  |
| Ditto ditto trunk, . . . . .  | 3     | 5                      |
| Ditto ditto tail, . . . . .   | 0     | 4 $\frac{4}{8}$        |
|                               | <hr/> |                        |
|                               | 3 ft. | 10 $\frac{6}{8}$ inch. |

Circumference of the neck 2, of the trunk 3  $\frac{2}{8}$ , of the root of the tail 2, of the apex 1  $\frac{3}{8}$  inch.

In the Malayan countries the species of *Bungarus* are not numerous, but *B. candidus*, and *fasciatus* are of no uncommon occurrence in Bengal and on the Coromandel Coast, where, however, it should be observed, a class of the natives ("serpent-charmers,") earn a livelihood by capturing and exhibiting serpents, but this craft is unknown among the Malays. The preceding three species, like the rest of the venomous serpents, are very ferocious when attacked, but unprovokedly they are not known to attack man: on the contrary, when met in the jungle, they attempt to escape. When trod upon, or struck, their rage is instantly excited, in self-defence they will even turn from their retreat, and then their habitual sluggishness is roused to furious activity.

Preparing to attack, the head is, by a short curve of the neck, brought closely to the body, and drawn far backwards, when suddenly darting the anterior part of the body obliquely upwards, they bite. The height of the place where the wound is inflicted, of course depends on the length of the serpent, which is capable of darting nearly the anterior half of the body. Notwithstanding the circular pupil, they appear to shun the light, hiding the head under the folds of the body, and they are singularly uncertain in their movements, often suddenly jerking the head or tail without any apparent object. Like all serpents of tropical Asia, they seldom expose themselves to the sun: when during the day they leave their hiding places, they select the shade. The genus *Bungarus* is terrestrial, feeding on rats, mice, serpents, (*Col. mucosus*, Lin.) and toads. Like other venomous serpents, when the venom has been inflicted on their prey, they disengage it from the fangs, sheathe and place them as horizontally as possible, in order that they may offer no resistance to the introduction into the mouth of the lifeless prey, which is now seized head foremost. The innocuous serpents bite or strangle their prey, which when life is extinct is either swallowed at once, or if it happens to have been killed in a position, likely to render the deglutition difficult, is often disengaged from between the teeth, and seized a second time, by the head. In captivity these serpents refuse food, but greedily lap up, and swallow water.

A fowl four minutes after it had been bitten on the innerside of the thigh, by a *Bungarus fasciatus*, fell on the wounded side, and was shortly after seized with slight purging. The eyes were half closed, the pupils alternately dilated and contracted, immobile. In 17 minutes slight spasms occurred, under which the bird expired 43 minutes after it had been wounded.

Another fowl wounded in the same place as the former, by the same serpent, but after an interval of seven hours, expired under similar symptoms, only more violent spasms, in the course of 28 minutes.

Venom taken from another serpent, the fangs of which had been extracted, was inoculated by a lancet-incision in the right thigh; four minutes after the fowl was seized with trembling, fell, and remained lying on the wounded side, with the eyes closed, but it gradually recovered, and rose apparently recovered, 30 minutes after the inoculation of the venom.

Other fowls were killed by different serpents of this species, in 20 to 31 minutes.

Fowls bitten by *Bungarus candidus* expired under similar symptoms, within 30 to 45 minutes; dogs from within 1 hour 10 minutes, to 2 hours, under symptoms noted in Russell's experiments (Russell I, page 53.)

SUB.-FAM. NAJINÆ, Bonaparte.

HAMADRYAS, Cantor.

Head broad, sub-ovate, depressed, with a pair of very large post-occipital shields, and a short, blunt muzzle; cheeks tumid; eyes large, prominent, pupil circular; nostrils wide, between two shields; behind the fangs a few maxillary teeth; neck dilatable; trunk thick, cylindrical; tail short, with Scuta and Scutella.

HAMADRYAS OPHIOPHAGUS, Cantor.

SYN.—Hamadryas hannah, Cantor.

Naja elaps, Schlegel, (Young.)

Naja bungarus, Schlegel, (Young.)

Naja vittata, Elliot.

Hamadryas ophiophagus, apud Elliot.

Olive green above; the shields of the head, the scales of the neck, posterior part of the body, and of the tail edged with black; the trunk with a number of distant, oblique, alternate black and white bands, converging towards the head; the throat and anterior part of abdomen impure gamboge, the rest of the scuta and scutella bluish grey, marbled with black, or pale yellowish green, with a narrow sub-marginal brown line. Iris golden, spotted with black; tongue bluish black.

Scuta 215 to 256, Scuta sub-caudalia 13 to 32; Scutella sub-caudalia 63 to 96.

HABIT.—Pinang, Singapore, Malayan Peninsula.

Java, Sumatra,\* Bengal, Assam,† Coromandel.

Of two individuals, from the summit of the Great Hill of Pinang, and from Province Wellesley, the larger was of the following dimensions:

\* Sir Stamford Raffles' specimen in the Museum of the Zoological Society, London.

† Specimen in the collection of H. Walker, Esq. Surgeon G. G.

|                          |                |
|--------------------------|----------------|
| Length of the head,..... | 0 ft. 3 ineh.  |
| Ditto ditto trunk,.....  | 8 1            |
| Ditto ditto tail,.....   | 2 4            |
|                          | <hr/>          |
|                          | 10 ft. 8 ineh. |

Circumference of the neck  $5\frac{2}{8}$ , of the trunk  $8\frac{5}{8}$ , of the tail,  $4\frac{1}{8}$  ineh.

The neck is covered by 21, the trunk by 17 longitudinal series of smooth imbricate scales: those of the two lowest series are large rhombic; of the sides irregular rhomboidal, appearing linear, all with rounded apex. The Malayan individuals are of a lighter colour, more inclining to yellow, than those observed in Bengal.

GEN. NAJA, *Laurenti*.

Head covered with shields; muzzle truncated; the anterior part of the trunk, between the 6th and 12th abdominal scutum, considerably dilatable in the shape of a disk, with a large, white, transparent spot above, edged with black, and somewhat resembling a pair of spectacles.

NAJA LUTESCENS,\* *Laurenti*, VAR (D, Daudin.)

SYN.—Seba II. T. 97, F. 4.

*Naja peruviana*, Lacépède.

Russell, I. Pl. 6, Fig. 4, Sankoo Nagoo.

Latreille IV. P. 27.

*Vipera naja*, Var D, Daudin.

*Aspis*, Wagler.

*Naja tripudians*, Var. Gray, Ill. Ind. Zool.

*Naja tripudians*, Merrem, Var. Schlegel.

“Ular mata-ari” of the Malays.

Head shining dark brown above; on the sides and lips brownish white; ground colour of the trunk buff, the anterior half of each scale pale greyish brown; beneath buff. Iris black with a narrow light grey margin towards the orbit; tongue light flesh-coloured.

*Young*.—Much lighter brown than the adult and strongly iridescent.

Scuta 189 to 193; Scutella 49 to 54.

\* *Coluber naja*, Linné, *Naja lutescens*, *Laurenti*, the cobra de Capello, has probably the widest range of the Asiatic venomous serpents. The species, or its varieties, inhabits the countries between the Sutlej and Cape Comorin, and Ceylon. According to Mr. Hodgson's observations it does not occur in the valley of Nepal, but it ranges through Hindustan down to Cape Romania, the southern extremity of the Malayan Peninsula, and from thence to Chusan, 30° N. E. 122° E. It is also found in the Philippines, Ternate, Borneo, Java, Sumatra.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

Bengal, Coromandel.

It is numerous in the Malayan hills and valleys, but apparently of uncommon occurrence in Bengal.

VAR. NIGRA.

SYN.—*Naja tripudians*, Var. *nigra*, Gray, Illustr. Ind. Zool.

*Naja tripudians*, Var. Schlegel.

Upper parts intense black with strong purple or blue reflections; temples, lips, and throat pale orange, largely spotted with black; the lateral part of the anterior eight or ten, and of the 14th, 15th, and 17th scuta pale orange, black in the centre and with a broad black margin; the scales and interstitial skin on each side of the anterior eighteen or twenty scuta white or buff, appearing on the lower surface of the hood as two short parallel bands. The rest of the abdominal surface paler black than above, strongly iridescent, in certain lights pale silvery. Iris black with the orbital margin pale grey; tongue light flesh-coloured.

Scuta 184 to 187; Scutella 49 to 52.

HABIT.—*Pinang, Singapore.*

At Pinang the preceding variety prevails, at Singapore the present. Both are local, and they appear respectively to congregate on single spots of limited extent. Another black variety (*Naja atra*, Cantor) which inhabits Chusan, differs from the present in having a number of distant transversal double lines of a yellow colour. Beneath it is slate- or pearl-coloured.

The food of *Naja lutescens* consists of rats, small birds, (it occasionally ascends trees,) lizards, and fishes, in search of which latter it frequently takes the water, and even the sea, along the coasts. The largest individual of the two Malayan varieties, was of the following dimensions:

|                               |       |                        |
|-------------------------------|-------|------------------------|
| Length of the head, . . . . . | 0 ft. | 1 $\frac{7}{8}$ inch.  |
| Ditto ditto trunk, . . . . .  | 4     | 1                      |
| Ditto ditto tail, . . . . .   | 0     | 9                      |
|                               | <hr/> |                        |
|                               | 4 ft. | 11 $\frac{7}{8}$ inch. |

Circumference of the neck,  $2\frac{7}{8}$ , of the trunk,  $4\frac{3}{8}$ , of the root of the tail,  $2\frac{3}{8}$  inch.



The following Memorandum relative to the venom of *Naja lutescens* (Laurenti) has kindly been communicated by J. W. Laidlay, Esq., Joint Secretary, Asiatic Society.

"The venom was carefully obtained so as to avoid any admixture of saliva, by compressing the venomous glands. It issued from the lower aperture of the fangs in viscid drops of a syrupy consistency, and was received as it fell from the fangs in platina capsules. The serpents operated upon were an adult *Cobra de Capello* (*Naja lutescens*, Laurenti) and one of its *Varieties* (*Naja kaouthia*, apud Belanger) and were supplied by the kindness of J. W. Grant, Esq. C. S."

"In every instance the venom readily changed the blue of litmus to red, and restored the bright yellow to turmeric paper that had been reddened by the application of caustic alkali; an unequivocal proof of acidity. When left to spontaneous evaporation, it dried into a varnish resembling mucilage, or the glare of an egg, cracking in all directions; and on being heated it deposited an abundant coagulum, apparently albuminous. In either instance when redissolved, it retained its acid property."

"What the nature of this acid may be, it was impossible to determine from the small quantity operated upon; nor am I prepared to say that the poison *itself* is an acid, although if it be not so, it is certainly associated with one. Most probably from the rapid and spontaneous disappearance of its properties by keeping, the poison itself consists of some exceedingly unstable compound, which would be wholly disorganised under any attempt at isolation by chemical means."

SUB.-FAM. VIPERINÆ, Bonaparte.

GEN. TRIGONOCEPHALUS, Oppel.

Head broad triangular, scaly, with a pit before the eyes; trunk robust, cylindrical, tail short, tapering to a point, with scutella beneath.

TRIGONOCEPHALUS GRAMINEUS, (Shaw.)

SYN.—Russell, I. Pl. 9, Bodroo Pam; II. Pl. 20.

*Coluber gramineus*, Shaw.

*Vipera viridis*, Daudin.

*Trimeresurus viridis*, Lacépède.

*Cophias viridis*, Merrem.

*Coluber gramineus*, apud Raffles: Tr. Linn Soc. XIII.

Bodroo Pam, Russell, apud Davy: Ceylon, &c.

Bothrops, Wagler.

*Trigonocephalus viridis*, Schlegel.

*Trigonocephalus erythrus*, Cantor, (young.)

"Ular daun" of the Malays.



Grass green above, lighter on the sides, frequently interrupted by zig-zag lines, produced by the black interstitial skin; the tail in some bright cinnamon-red; from the sides of the neck along the lowest series of scales a pale yellow line. Lips, throat and abdominal surface greenish yellow; scutella in some spotted with cinnamon-colour. Iris golden, dotted with brown, but leaving a narrow margin bordering the elliptical black pupil, which is vertically contracted by the light. Tongue pale bluish with black apex.

Scuta 165 to 170; Scutella 58 to 71.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

New-Holland,\* Timor, Pulo Samao, Celebes, Eastern Java, Banka, Sumatra, Tenasserim, Bengal, Chirra Púñji, Nipal† Coromandel, Ceylon.

VAR.

SYN.—*Coluber gramineus*, Var. apud Raffles, l. c.

Differs from the preceding by its Indian or brick-red line on each side.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

Sumatra, Tenasserim.

In the Malayan hills and valleys the variety is by far the more numerous: it is indeed the most common of the venomous serpents. In Bengal I never observed but a single young one, (*T. erythrurus*,) captured in the Sunderbuns. It is generally observed on trees, hanging down from the branches, or concealed under the dense foliage; it preys on small birds and tree-frogs [*Polypedates leucomystax*, (Gravenhorst.)] But occasionally it descends to the ground, in search of frogs and toads. The neck is covered by 27, the trunk by 23 or 25 ovate imbricate, keeled scales. The tail is prehensile.

Of a number examined none exceeded the following dimensions:

|                               |                             |
|-------------------------------|-----------------------------|
| Length of the head, . . . . . | 0 ft. 1 $\frac{4}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2 0                         |
| Ditto ditto tail, . . . . .   | 0 5 $\frac{6}{8}$           |
|                               | <hr/>                       |
|                               | 2 ft. 7 $\frac{2}{8}$ inch. |

\* Lacépède, on the authority of M. Baudin.

† Specimen in Mr. Hodgson's collection.

Circumference of the neck,  $1\frac{4}{8}$ , of the trunk,  $2\frac{2}{8}$ , of the root of the tail, 1 inch.

TRIGONOCEPHALUS SUMATRANUS, (Raffles\*) VAR. (See pl. XL, Fig. 9.)

SYN.—“Ular kápak” of the Malays of the Peninsula.

*Young*.—Grass green above, lighter on the sides and lips; from the pit beneath the eye, over the cheek a cinnamon red line with the upper margin buff; on each side of the back a series of distant spots, half cinnamon, half buff coloured, each of the two or three scales composing the spots, being of these two colours; on the tail the spots are confluent, forming transversal lines. Beneath light yellowish green. The largest individual in this garb measured 1 ft.  $3\frac{6}{8}$  inch in length.

*Adult*.—Ground colour above light yellow, or pale greenish yellow, largely mixed with intense dull black, so as to make the general appearance black, through which the ground-colour appears on the head as irregular spots, and a continued line, beneath which a black line proceeds from the eye to the occiput: on the trunk and tail as narrow, distant, transversal bands, continued or broken up into spots. Labials, gulars, the lowest two or three lateral series of scales, and scuta gamboge with black margins; scutella largely spotted with black. Iris golden dotted with black and with a black transversal bar, pupil elliptical, vertically contracted by the light; tongue bluish grey.

Scuta 141 to 147; Scutella 42 to 52.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

Unfortunately in the Malayan countries this variety is not of so rare occurrence as the species appears to be in Sumatra. Both are equally dreaded. The natives of Sumatra denominate it “Púchuk,” a young, green shoot of a tree, a name expressive both of its colour and arborial habits. The Malays of the Peninsula, who only know the black variety, call it from its broad cordate head the “hatchet-shaped” serpent, “Kápak,” or “Kápal” signifying an axe. At Pinang it generally occupies the lower parts of the hills or the valleys, either on the ground or on trees, but Dr. Montgomerie in one instance observed it at an elevation of 2,200 feet. It preys upon rats, small birds, tree-frogs and

\* SYN.—Seba, II. T. 63, F. 4.—*Coluber sumatranus*, Raffles, Ular Poochook.—*Cophias wagleri*, H. Boie.—*Tropidolemus*, Wagler.—*Trigonocephalus wagleri*, Schlegel.

HABIT.—Sumatra.

toads. The neck is covered by 27, the trunk by 23 to 25 longitudinal series of ovate, imbricate keeled scales. The labials, and the gular scales are sharply keeled, but the keels of the former become obliterated with age. The tail is prehensile. Of nine examined the largest individual was of the following dimensions :

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | 2 inch.              |
| Ditto ditto trunk, . . . . .  | 1     | $6\frac{1}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $6\frac{1}{8}$       |
|                               | <hr/> |                      |
|                               | 2 ft. | $2\frac{5}{8}$ inch. |

Circumference of the neck,  $2\frac{6}{8}$ , of the trunk,  $4\frac{1}{8}$ , of the root of the tail,  $1\frac{6}{8}$  inch.

TRIGONOCEPHALUS PUNICEUS, Reinwardt.

SYN.—Seba, II, Tab. 64. Fig. 1.

Klein : Tentan. Pg. 10. No 25.\*

Vipera acontia, Laurenti.

Coluber acontia, Gmelin.

Vipera acontias, Daudin.

Echidna acontia, Merrem.

Trigonocephalus puniceus, Reinwardt.

Atropos, Wagler.

Trigonocephalus purpureomaculatus, Gray. Ill. Ind. Zool.

Trigonocephalus puniceus, Schlegel.

Dull reddish-brown or olive tinged with purple ; in some an indistinct black line from the eye to the sides of the neck ; the scales dotted or finely marbled with black, their keels pale ochre ; the posterior part of the trunk and tail with irregular dark brown spots ; the interstitial skin reddish brown, lighter or darker than the scales ; lips, throat, the three or four lowest series of scales, and beneath pale greenish yellow ; scuta and scutella with brown margins, the latter largely spotted with brown. Iris greenish golden marbled with black ; pupil elliptical vertically contracted by the light ; tongue light brownish grey.

Scuta 162 to 171 ; Scutella 65 to 70.

HABIT.—Pinang, Malayan Peninsula.

Singapore, Java.

The malayan individuals differ slightly from the javanese in having very few dark spots and no reddish line above the black one on the

\* As several serpents have by Klein been indicated under the name of *acontias*, the specific name of Reinwardt has been substituted.

sides of the head. The oval gular scales have a tubercular appearance. The integuments of the head and body are remarkably lax, like those of *Acrochordus javanicus*. The neck is covered by 31, the trunk by 27 longitudinal series of ovate or conical scales; they are not imbricate, but are frequently surrounded by the naked skin. The tail is prehensile, but less so than in the preceding species. The malayan individuals appear to be less numerous than the javanese. The four observed were all found on the ground in valleys. The largest, which had been feeding on a rat, was of the following dimensions:

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | $1\frac{4}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2     | $5\frac{3}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $5\frac{4}{8}$       |
|                               | <hr/> |                      |
|                               | 3 ft. | $0\frac{3}{8}$ inch. |

Circumference of the neck, 2, of the trunk,  $3\frac{4}{8}$ , of the root of the tail,  $1\frac{3}{8}$  inch.

In general sluggish, but when roused, ferocious habits, the preceding three species resemble the genus *Bungarus*; their mode of attack is also similar: like *Vipera russelli*, (Shaw)\* when it prepares to dart, they vibrate the prehensile tail, and utter a faint hissing sound. As the pupil is vertically contracted by the light, they frequently miss their aim, and like *Bungarus*, *Naja*, *Vipera russelli* and *Hydrus*, in the extreme of fury, they will fix the fangs in their own bodies. Although they are averse to motion, they are not of quite so stationary habits as represented by M. Schlegel, (*Essay: Partie Descriptive*, page 520.) In the jungle I have noticed them moving between the branches of trees or on the ground, either in search of prey, or after heavy rains have flooded their hiding places. In Bengal most terrestrial serpents keep the latter during the hot season, but the rains send them abroad in search of dry localities. Although the present genus has venomous organs, as highly developed as *Crotalus* or *Vipera*, the effects produced by wounds of two species at least, appear to be less dangerous, than might *à priori* be supposed. According to Russell's experiments with the venom of *Trigonocephalus gramineus*, chickens expired within 8 to 33 minutes, pigeons in 14 to 18 minutes. A pig recovered in 6 or

\* SYN.—Russell, I. Pl. 7. *Katuka Rekula Poda*, II. Pl. 32.—*Coluber russellii*, Shaw.—*Vipera elegans*, Daudin.

7 hours, a dog in 2 to 3 hours, after having been wounded, (Russell, I. page 60.) Mr. Hodgson has seen a man who was wounded by this species, the only venomous known to inhabit Nepal, fearfully suffering from pain and swelling, but he never heard of a fatal case.—(*Transactions Zoological Society. London. Vol. II, page 309.*)

A male *Trigonocephalus puniceus*, successively wounded two fowls, one in the chest, the other in the left thigh. In both cases the fangs of both sides acted, but neither of the birds experienced any other effect except a slight pain, which lasted a few minutes after they had been wounded. It should, however, be observed, that the serpent at the time had gorged itself with food, in which state it was observed close to the General Hospital, in the valley of Pinang. Another individual was subsequently caused to wound a fowl on the inside of the thigh. The bird immediately drew up the wounded leg, fell down and was purged 3 minutes after being wounded. In 3 minutes more, slight spasms of the head and neck appeared at short intervals, but they ceased in 5 minutes, when the fowl made, at first some unsuccessful, attempts to rise. Twenty-one minutes after having been wounded, the bird rose, shook the wings, and had perfectly recovered. The same serpent subsequently was made to wound another fowl on the inside of the left thigh. The bird drew up the wounded leg, and was slightly purged, but showed no other inconvenience from the wound.

The following experiment is communicated by Dr. Montgomerie. An adult *Trigonocephalus sumatranus*, Var. was made to bite a fowl in the fleshy part of the thigh. The bird limped about for a short time, and a minute after it was wounded commenced purging. At the end of two minutes it fell, breathing laboriously and was strongly convulsed. At the end of six minutes a few drops of water exuded from the eyes; in fifteen seconds more it was quite dead: six minutes and a quarter after it had been wounded. Both fangs had acted, the wound was livid, and similar lines were observed in the course of the absorbents. On another occasion, after some unsuccessful attempts to make another individual bite a fowl, a terrier accidentally was wounded in the fleshy part of the fore-arm. The serpent fixed the fangs for an instant in the flesh; the dog pitifully screaming, jumped and shook it off. A ligature was immediately applied above the elbow, and the dog secured in a cage. It continued for some time whining from pain,



probably aggravated by the tight ligature, which was removed at the close of half an hour, and the dog let free. In a short time it had regained the free use of the limb and was apparently well. But on the third day following a perfectly circular slough, including the bitten spot of about  $\frac{3}{4}$  of an inch in diameter, was thrown off, the sore readily healed up and the dog suffered no further inconvenience.

#### PELAGIC.

#### FAM. HYDRIDÆ, BONAPARTE.

#### GEN. LATICAUDA, *Laurenti*.

Tail compressed, with two surfaces, gradually increasing in height, and with three furrows (sutures) on each side.

#### LATICAUDA SCUTATA, *Laurenti*.

SYN.—*Coluber laticaudatus*, Linné. Mus. A. Fig. 1754.

*Laticauda imbricata*, *Laurenti*? 1768.

Le serpent large-queue, Daubenton, 1784.

*Coluber laticaudatus*, apud Thunberg, 1787.

*Coluber laticaudatus*, apud Gmelin, and E. W. Gray, 1789.

La queue plate, Lacépède, 1801.

*Hydrus colubrinus*, Schneider, 1801.

*Platurus fasciatus*, Latreille, 1802.

*Hydrus colubrinus*, apud Shaw, 1802.

*Platurus fasciatus*, Daudin, 1803.

*Aipysurus lævis*, Lacépède, 1804, (Var?)

*Platurus semifasciatus*, Reinwardt, M. S.

*Platurus fasciatus*, apud Wagler, 1830.

*Hydrophis colubrina*, Temminck and Schlegel, Fauna Japonica, Tab. 10.

*Hydrophis colubrina*, Schlegel, 1837.

*New born*.—Ground colour gamboge, greenish above, with numerous distant broad rings of a blue reflecting black colour, encircling the body; the first and second black mark of the head and neck are beneath joined by a short longitudinal line, commencing on the lower labial shields; another shorter black line borders above the gamboge upper labials; the scales between the rings, the scuta and scutella with blackish margins.

*Older*.—Of paler colours, lead-grey on the back; the rings impure light blue on the sides and abdomen. The scales and scuta without blackish margins. Iris black, pupil circular; tongue grey.

Scuta 227 to 246; Scutella 32 to 41.

HABIT.—*Sea of the Malayan Peninsula and Islands.*

Bay of Bengal (Ramree, Pondicherry, Nicobars), Sea of Timor, Molucca and Liewkiew Islands, Celebes, New Guinea, Tongataboo, China Sea.



This species is readily identified by the abdominal senta, and the sentellated very broad tail. The anterior frontals are separated by a small elongated pentagonal, or rhombic, shield, bordered behind by the vertical, which is proportionally the largest shield, either equaling or exceeding each of the occipitals. The eyes are comparatively large and prominent, surrounded by two post-orbitals, one præ-orbital, and beneath, by the third and fourth of the seven large upper labials. The lower jaw is covered in front by the rostral and the two first labials, the succeeding seven are elongated linear and placed horizontally so as to be hid by the upper labials, when the mouth is closed. The chin is covered by two pairs of pentagonal shields, between which and the labials appear two or three series of elongated scales. The neck is covered by 25, the anterior part of the trunk by 23, increasing to 25 and again decreasing to 19 longitudinal series of large, smooth scales. The nostrils are small, opening laterally. The tail, though much compressed, presents a broad flat surface beneath, till near the apex, where it becomes two-edged. The largest individual examined was of the following dimensions :

|                               |                             |
|-------------------------------|-----------------------------|
| Length of the head, . . . . . | 0 ft. 1 inch.               |
| Ditto ditto trunk, . . . . .  | 3      2                    |
| Ditto ditto tail, . . . . .   | 0      5 $\frac{3}{8}$      |
|                               | <hr/>                       |
|                               | 3 ft. 8 $\frac{3}{8}$ inch. |

Circumference of the neck, 1 $\frac{7}{8}$ , greatest do of the trunk, 4 inch.

#### GEN. HYDRUS, *Schneider*.

Body slender in front, gradually thickening, covered with scales ; tail compressed, two-edged.

#### HYDRUS STRIATUS, (Lacépède.)

SYN.\*—*Leioselasma striata*, Lacépède, 1804.

*Hydrophis striata*, Temminck and Schlegel: Fauna Japon. Pl. 7.

*Hydrophis striata*, Schlegel: Essay, 1837.

*Hydrophis striata*, Schlegel, apud Cantor, Tr. Zool. Soc. London, Vol. II.

\* DOUBTFUL SYNONYMY.—*Russell*, II. Pl. 9, *Chittul*, 1801, agrees with this species in the following characters: the eyes high, small, orbicular ; the trunk round till near the anus, where it becomes compressed ; the scales smooth, imbricate, orbicular on the sides ; the central abdominal series much larger than in any of the other species, (*Russell*.) The difference of colours is unimportant, as it is liable to variations, not only individually but according to age. Besides, all the species acquire a light bluish appearance about

*Adult ?*—Crown shields light chestnut ; lips and throat pale yellow ; ground colour above pale greenish yellow, sides and abdomen buff with numerous distant black transversal bands, becoming indistinct towards the tail and on the sides, where the scales are partially edged or spotted with black. The interstitial skin of the back and sides black, of the abdomen buff. Iris dark grey with a buff orbital margin ; pupil black minute ; tongue buff.

Central abdominal series of larger scales, 347 + 41.

HABIT.—*Sea of Pinang and Malayan Peninsula.*

Sea of Liewkiew Islands, Timor, Sumatra, Bay of Bengal.

The eyes are lateral, sunk, excessively small, of a diameter equalling the large almost vertically opening nostrils. The single præ-orbital shield is beneath wedged in between the second and third upper labial. The latter, as well as the fourth and fifth, border the orbit beneath. Of the two post-orbitals the lower is wedged in between the fifth upper labial and the large shield resting upon the sixth upper labial. Above the latter and the seventh, the cheeks are covered by three very large shields. The seven upper labials are large and very high. Of the nine inferior labials the two anterior are the largest, and placed vertically, the succeeding seven are smaller and placed nearly horizontally, so as to become partially hid when the jaws are closed. The chin is covered by the first pair of labials and two pairs of elongated mentals, between which and the inferior labials intervene on each side the second labial, three very large shields, and three smaller. The neck is covered by 37, the anterior part of the trunk by 33, and the thickest by 40 longitudinal series of rhombic scales. In the individuals examined by M. Schlegel, all of less length than my own, the series varied from 31, 29 to 27. The scales are rhombic with rounded apex, each scale with a small central tubercle, or an elevated (keeled) line, which however with age becomes indistinct or obliterated. The central larger

the period when the integuments are to be changed. Russell's description was copied by Daudin, who merely supplied the denomination of *Hydrophis cyanocinctus*, (*Hydrus brugmansii*, Boie, 1827,) upon which Wagler founded his genus *Enhydris*, 1830. According to M. Schlegel, all these are Synonymes of *Hydrus nigrocinctus* (Daudin). The only means of deciding the Synonymy of this and most of the other species appears to be a close examination of such original specimens, described by Russell and Shaw, which may at present exist in the collection of the British Museum.

abdominal scales are hexagonal, with or without a small tubercle on each side. The anus is covered by three or four excessively large scales. The larger individual of two was of the following dimensions :

|                               |                             |
|-------------------------------|-----------------------------|
| Length of the head, . . . . . | 0 ft. 1 $\frac{5}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 5 6 $\frac{3}{8}$           |
| Ditto ditto tail, . . . . .   | 0 4 $\frac{6}{8}$           |
|                               | <hr/>                       |
|                               | 6 ft. 0 $\frac{6}{8}$ inch. |

Circumference of the neck, 3  $\frac{3}{8}$ , greatest do. of the trunk, 4  $\frac{2}{8}$  inch.

#### HYDRUS NIGROCINCTUS, (Daudin.)

SYN.\*—Russell, II. Pl. 6. Kerril Pattee, 1801.

Hydrophis nigrocinctus, Daudin, 1803.

Hydrophis melanurus, Wagler, 1828.

Polyodontes annulatus, Lesson, 1833.

Hydrophis nigrocincta, Schlegel, 1837.

Hydrophis nigrocincta, Schlegel, apud Cantor, l. c.

*New born*.—Ground colour buff or bluish-white; upper-lips and muzzle black, and a transversal band across the hind head, from whence proceeds a triangular or cross mark towards the vertex; gular and inferior labial shields edged and spotted with black; trunk and tail with numerous black transversal bands, either encircling the body, or interrupted on the abdominal ridge, where appear a few indistinct black spots; apex of the tail black. Entire length 8  $\frac{4}{8}$  inch.

*Older*.—Greyish green olive above, yellowish on the sides, buff beneath; the bands less intense black, often placed obliquely so as to join each other on the back. Iris grey; pupil circular, black; tongue buff. Central abdominal series of larger scales, 281+41; 284+43; 289+39.

HABIT.—*Sea of Malayan Peninsula, Pinang, Singapore.*

Estuaries of the Ganges, Bay of Bengal.

This species greatly resembles *H. striatus*, from which it differs in the more compressed general form; the eye though small, is of a larger diameter than the nostril, and it is surrounded by a single post-orbital shield, which beneath is wedged in between the fourth and fifth upper labial, and the præ-orbital between the second and third. The orbit is bordered beneath almost entirely by the fourth upper labial. The

\* DOUBTFUL SYN.—Russell, II. Pl. 13, Kuddell Nagam, 1801. (*Enhydrys gracilis*, Merrem, 1820.) *Hydrus spiralis*, Shaw, 1802.

sixth upper labial is the largest, in some individuals covering the cheek and bordering above the occipital. Of the seven or eight inferior labials the four anterior are very large; above the third there is one or two small triangular shields; the other three or four posterior labials are very small elongated. There is no horizontal series of labials as in *H. striatus*, and the two elongated pairs of mentals immediately border the labials. The neck is covered by 33, the thickest part of the trunk by 53 longitudinal series of scales. Those examined by M. Schlegel, the length of which exceeds those come under my own observation, had 27, 29 to 31 series of scales. Those of the anterior part of the back are rhomboidal, those of the posterior part rhombic with rounded apex and slightly imbricate; those of the sides hexagonal: all have either a sharply raised keel or a central tubercle, both of which frequently become obliterated. The central series of abdominal scales are a little larger than the rest, frequently divided in two hexagonal, and with a small tubercle on each side, which often becomes indistinct, or obliterated. The anus is covered by 3 or 4 very large, or by a series of small scales. The largest of six individuals was of the following dimensions:

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | $0\frac{5}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2     | $0\frac{2}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $2\frac{5}{8}$       |

---

2 ft.  $3\frac{5}{8}$  inch.

Circumference of the neck,  $\frac{5}{8}$ ; greatest do. of the trunk, 2 inch.

VAR. ? (See Pl. XL. Fig. 8.)

Crown shields olive green with a blackish band from the eyes over the anterior part of the upper lip; the posterior part and the lower lip pale yellow; ground colour of the trunk greenish lead grey above, pale yellow on the sides, beneath buff, with numerous black transversal bands. Iris amber-coloured with the orbital margin dark grey. Central abdominal series of scales 235+38.

It differs from the preceding in the following particulars. The head is proportionally shorter, broader triangular, the muzzle more pointed, and the upper surface from the vertical shield very declivous. The eyes are much larger than the nostrils, with a single præ- and post-orbital, but bordered beneath by the third and fourth upper labial.

The latter, six in number, present nothing abnormal. The lower labials are also six, proportionally larger than in the preceding. The mouth is smaller. The make of the trunk is more robust; the neck is covered by 15, the thickest part of the body by 21 longitudinal series of proportionally much broader hexagonal scales, tuberculated on the anterior part of the trunk, on the rest keeled, forming series of sharp, continued ridges. The central abdominal series is at first somewhat larger than the rest, angular, with a small more or less distinct tubercle on each side. A single individual, captured in a fishing stake off Pinang, was of the following dimensions:—

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | $0\frac{6}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 1     | $6\frac{2}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $2\frac{4}{8}$       |
|                               | <hr/> |                      |
|                               | 1 ft. | $9\frac{4}{8}$ inch. |

Circumference of the neck,  $1\frac{3}{8}$ , greatest do. of the trunk,  $2\frac{1}{8}$  inch.

#### HYDRUS GRACILIS, Shaw.

SYN.\*—Russell, I. Pl. 44, Tatta Pam, 1796, (very young.)

*Hydrus fasciatus*, apud Shaw (Russell, I. 44, excluding the other *Syn.*) 1802.

*Angvis manillaris*, Dandin, 1803.

*Hydrus*, apud Wagler, 1830.

Russell, II. Pl. 7, Shootur Sun, 1801.

*Hydrus cloris*, Dandin, 1803.

*Hydrophis*, apud Wagler, 1830.

Russell, II. Pl. 8, Kalla Shootur Sun, 1801.

*Hydrophis obscurus*, Dandin, 1803.

*Hydrophis*, apud Wagler, 1830.

*Hydrus fasciatus*, apud Guérin: Iconog. Rept. Pl. 25, 1, 1829.

*Pelamis chloris*, Merrem apud Horsfield: Life of Raffles, 1830.

*Microcephalus gracilis*, Lesson, 1833.

*Hydrophis gracilis*, Schlegel (*Syn.* *Angvis xiphura*, Hermann, Typhlops, Merr. Tent. p. 158,) 1837.

*Hydrophis gracilis*, Schlegel, apud Cantor, l. c. Pl. 56, (Young.)

*New born*.—Head shining intense black; ground colour of the trunk and tail bright gamboge, on the back and sides interrupted by numerous black rings, which above are widened into lozenge shape, narrowed on the sides. Throat and anterior half of abdomen intense black, continued as a more or less distinct line to the black apex of the tail. On the sides the yellow ground colour appears in the shape of oval spots,

\* DOUBTFUL SYN.—*Angvis laticauda*, Linné, Mus. A. F. 1754. *Vosmaer*, *Monogr. Fig.* 2, 1774, *Hydrus fasciatus*, Schneider, 1801.



gradually increasing in depth towards the tail. Entire length, 1 ft. 3 inch.

*Adult?*—Head and back uniformly dark olive or brown, becoming greyish on the posterior half, and very indistinct or obliterated on the sides. In some a pale yellow spot on each side of the hindhead, and a third on the frontal shields. The lateral oval spots pale sulphur coloured on the anterior half, pale greenish yellow on the posterior. The black of the lower surface very pale, but distinct. Iris black; tongue buff.

Central abdominal series of larger scales, 45+60.

HABIT.—*Sea of Malayan Peninsula and Islands.*

Bay of Bengal, Malabar, Sumatra, Borneo.

In form and number the shields of the head resemble those of *Hydrus nigrocinctus*, so as to afford no distinguishing character. Yet it may be readily distinguished from that and other species by the excessive slenderness of the anterior, cylindrical part of the trunk, which from thence becomes much compressed, gradually increasing in bulk and vertical diameter till towards the tail, where the diameter again decreases. The scales of the cylindrical, anterior part of the trunk are rhomboidal with rounded points and slightly imbricate; the rest are hexagonal. The central abdominal series continued beneath the tail, consists of hexagonal scales, a little larger than the rest, and frequently longitudinally divided. In the very young all the scales are smooth, with age the central abdominal ones acquire a small tubercle on each side, and those of the compressed sides and of the back each a central tubercle. In the largest individuals the central abdominal scales have three longitudinally placed minute tubercles on each side, and the rest of the hexagonal scales three or four similar central tubercles. In the new-born the neck is covered by 32, the bulkiest part of the body by 49 longitudinal series; these parts are covered by 26 and 44 series in the largest individual, which is of the following dimensions:

|                           |       |                             |
|---------------------------|-------|-----------------------------|
| Length of the head, ..... | 0 ft. | 0 $\frac{5}{8}$ inch.       |
| Ditto ditto trunk, .....  | 3     | 2 $\frac{5}{8}$             |
| Ditto ditto tail, .....   | 0     | 4                           |
|                           |       | <hr/>                       |
|                           |       | 3 ft. 7 $\frac{3}{8}$ inch. |

Circumference of the neck, 1  $\frac{2}{3}$ , of greatest do. of the trunk, 3  $\frac{6}{8}$  inch.

## HYDRUS SCHISTOSUS, (Daudin.)

SYN.\*—Russell, II, Pl. 10, Hoogli Pattee, 1801.

Russell, II, Pl. 11, Valakadyen, 1801.

Hydrophis schistosus, Daudin, 1803.

Hydrus valakadyen, II. Boie, 1827.

Disteira russelli, Fitzinger, 1827.

Hydrophis, apud Wagler, 1830.

Leiosclasma schistosa, Fitzinger, 1827.

Hydrus, apud Wagler, 1830.

Hydrophis schistosa, Schlegel, 1837.

Hydrophis schistosa, Schlegel, apud Cantor, l. c.

*New born*.—Head above blackish or dark brown; back and sides with numerous transversal blackish bands, broad above, narrow on the sides; lips, throat, sides and abdomen buff; tail blackish with a few transversal buff bands above. Entire length  $10\frac{3}{8}$  inch.

*Adult?*—Head above and back either uniformly pale greenish grey, or with darker transversal bands, becoming more or less indistinct on the sides; lips, throat, sides brownish white or buff; tail uniformly blackish, or greyish olive-green. Iris pale amber or greenish-yellow, with a grey orbital margin; pupil black, tongue buff.

Central abdominal series: 239+47; 242+42; 312+58.

HABIT.—*Sea of Malayan Peninsula and Islands.*

Bay of Bengal, Malabar, Sumatra.

The head is elongated conical, the muzzle sloping and the rostral shield beneath terminating in a vertically projecting point, which fits into a corresponding cavity in the lower jaw. The anterior elongated triangular frontal shields are next to the occipitals the largest; the large oval nostrils send a slit towards the external margin of the shield. The eyes are lateral, moderate, surrounded by a præ-orbital, a post-orbital, frequently cut in two smaller, and beneath by the fourth upper labial shield. Behind the latter, the lip is covered by three or four horizontally placed small shields, above which appear three large vertically placed shields, of which the last borders the sides of the occipital pair. The lower rostral is remarkably elongated, linear, and hid in a furrow between the first pair of inferior labials. Of the latter the anterior five on each side are much elongated, followed by five or six smaller. The chin is covered with numerous minute scales, and like

\* DOUBTFUL SYN.—*Hydrus major*, Shaw, 1802.—*Disteira doliata*, Lacépède, 1804.

the rest of the body with very lax skin. In the young ones the neck is covered by 47, the bulkiest part of the body by 57 longitudinal series of smooth, somewhat tubercular scales. Older individuals have these parts covered by 48 and 60 series of hexagonal scales, either with a short keel dividing the anterior half, or a central tubercle. The central, slightly raised, abdominal series commences very far back, from one to three inches behind the chin. The anterior scales are wedge-shaped hexagonal, the posterior are broader, but slightly larger, than the rest, with a small elongated tubercle on each side. The largest individual of a great number, was of the following dimensions :

Length of the head, . . . . . 0 ft. 1 inch.

Ditto ditto trunk, . . . . . 3  $1\frac{4}{8}$

Ditto ditto tail, . . . . . 0  $4\frac{4}{8}$

---

3 ft. 7 inch.

Circumference of the neck,  $2\frac{3}{8}$ , greatest do. of the trunk, 5 inch.

#### HYDRUS PELAMIDOIDES, (Schlegel.)

SYN.\*—*Pelamis carinata*, Cuvier, MS.

*Hydrophis* (*Disteira doliata*, Lacép.) Wagler, 1830.

*Lapemis hardwickii*, Gray, Ill. Ind. Zool. 1832.

*Hydrophis pelamidoides*, Schlegel, 1837.

*Hydrophis pelamidoides*, Temminck and Schlegel, Fauna Japon. Tab. 9.

*Hydrophis pelamidoides*, Schlegel, apud Cantor, l. c.

*Young*.—Sulphur coloured, paler on the sides and abdomen ; the head largely spotted with blackish, through which the ground colour appears in the form of a rectangle, the two sides of which pass from the hind-head to the orbit, the anterior across the frontals, the posterior over the hind-head ; two yellow spots between the nostrils ; lips yellow, cheeks and throat blackish ; on the back a number of transversal blackish bands to the middle of the sides, broader than the intervening yellow lines ; tail black. Entire length  $10\frac{1}{8}$  inch.

*Adult ?*—Head uniformly reddish brown above ; ground colour greenish yellow, lighter on the sides and beneath, with broad lozenge shaped transversal bands of a blackish olive, continued on the anterior half of the tail ; posterior half blackish. Iris dark olive ; pupil black ; tongue buff.

\* DOUBTFUL SYN.—Russell, II, Pl. 12, Shiddil, 1801.—*Hydrus curtus*, Shaw, 1802.

HABIT.—*Sea of Malayan Peninsula and Islands.*

Bay of Bengal, Sea of Celebes, Molucca Islands, China Sea.

The head is much depressed, not broader than the neck; the muzzle broad, rounded; the rostral shield is large, rectangular pentagonal, broader than high, the lower margin with a central point and a notch on each side. The eyes are moderate, lateral, not prominent, surrounded by a præ-orbital, a post-orbital, and beneath by the third and fourth upper labials. The frenal shield, observed by M. Schlegel, was not present in four individuals, examined in the straits of Malacca: its existence therefore appears not to be constant: in all *Hydri* the shields of the head are liable to considerable individual variations of form. Of the eight upper labials the posterior three are very small, which is also the case with the posterior five of the nine inferior labials. The two pairs of elongated mentals are outside bordered by the three first inferior labials, inside, by several small scales. In the young the neck is covered by 37, the thickest part of the trunk by 40 longitudinal series of hexagonal, smooth, comparatively small scales. In the older individual these parts are covered by 32, and 37 large hexagonal scales, each with a central tubercle. The lower series of the sides are slightly larger than the rest, and vertically elongated, so as to acquire a rectangular appearance. The central abdominal series is much smaller than the rest. Each scale is either rhombic, and, as represented in the excellent plates of *Fauna Japonica*, hemmed in between four\* of the two lowest lateral series, or they are absent, and their place is occupied by a pair of the former, which are soldered together. In young individuals the central series frequently consists of alternate broad triangular, and very minute rectangular scales, both kinds smaller than the rest. The largest individual of four was of the following dimensions:

|                               |       |                       |
|-------------------------------|-------|-----------------------|
| Length of the head, . . . . . | 0 ft. | 1 inch.               |
| Ditto ditto trunk, . . . . .  | 1     | 8                     |
| Ditto ditto tail, . . . . .   | 0     | $2\frac{1}{8}$        |
|                               | <hr/> |                       |
|                               | 1 ft. | $11\frac{1}{8}$ inch. |

Circumference of the neck,  $2\frac{1}{8}$ , greatest do. of the trunk, 4 inch.

\* A somewhat similar disposition is observed in the central dorsal series of the however differently shaped scales of *Xenodermus javanicus*, Reinhardt.

## HYDRUS BICOLOR, Schneider.

SYN.—Seba, II, Tab. 77, Fig. 1.

Anguis platyrus,\* Linné, 1766.

Vosmaer: Monogr. Fig. 1. 1774.

Anguis platyrus, apud Gmelin, 1788.

Russell, I, Pl. 41. Nalla Wahlagillce Pam. 1799.

Lacépède V, Tab. 15, Fig. 2, 1801.

Hydrus bicolor, Schneider, 1801.

Hydrophis platyrus, Latreille, 1802.

Hydrus bicolor, apud Shaw, 1802.

Pelamis bicolor, Daudin 1803.

Pelamys (Anguis platyrus, Lin.) Wagler, 1830.

Pelamis bicolor, apud Horsfield, Life of Raffles, 1830.

Pelamis bicolor, apud Oken, 1836.

Hydrophis pelamis, Schlegel, 1837.

Hydrophis pelamis, Temminck and Schlegel, Fauna Japonica, page 60.

Head and back black (inky), forming a straight line on the sides till towards the posterior part, where it becomes largely undulating, so as to appear as broad bands; lips, throat and sides sulphur coloured, turning into yellowish white or buff on the abdomen† and tail; posterior parts of the sides with some more or less distinct rounded black spots; tail largely banded or spotted with black. Iris pale yellow with a broad black orbital margin; pupil black; tongue buff.

HABIT.—Sea of Malayan Peninsula.

Bay of Bengal, Malabar, Sea of Sumatra, Java, Celebes,

Molucca Islands, China Sea (to 27° N. Lat.) Otaheite,

Bay of Port Jackson (33° 55' S. Lat.—151° 25' E. Long.)

The head is very elongated, depressed, viewed from above, it presents a striking resemblance to *Herpetodryas oxycephalus* (Reinwardt). The eye is larger than in any other species of *Hydrus*, surrounded by two, three, or even four post-orbitals, one large præ-orbital, and beneath, by the fourth upper labial shield. A frenal shield has been observed in some individuals, but it was absent in that examined in the straits of Malacca, nor does it exist in the specimens, in the Museum of the Asiatic Society. The neck is covered by 44, the thickest part of the trunk by 52 longitudinal series of small scales. Those of the upper parts are smooth, hexagonal; those of the sides approach the orbicular form, and have in the centre one, two or three longitudinally placed

\* In consequence of the specific name of Linné having been applied by Latreille to a genus (*Platurus*), that of Schneider, the next different in succession, has been substituted.

† In the individual figured by Russell, the bright yellow colour formed a narrow lateral line, below which the sides and abdomen were of a dusky greenish yellow.



minute tubercles. Similar tubercles are observed on each side of the scales, forming the central abdominal series, which is composed either of entire hexagonal scales, a little larger than the rest, or they are longitudinally divided into pairs of smaller pentagonal scales, which have the appearance of being divided by an abdominal suture. A single individual taken in a fishing stake, off the coast of Province Wellesley was of the following dimensions :

|                               |       |                      |
|-------------------------------|-------|----------------------|
| Length of the head, . . . . . | 0 ft. | $1\frac{5}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2     | $1\frac{7}{8}$       |
| Ditto ditto tail, . . . . .   | 0     | $3\frac{6}{8}$       |
|                               |       | <hr/>                |
|                               | 2 ft. | $7\frac{2}{8}$ inch. |

Circumference of the neck,  $2\frac{1}{8}$ , greatest do. of the trunk,  $3\frac{2}{8}$  inch.

The preceding, comprising all the hitherto known species of pelagic serpents were observed chiefly at Pinang, among the abundant supply of fishes, daily carried to the markets. Of their general habits some account appears in the *Transactions of the Zoological Society, London, Vol. II, p. 303*. One of them, *Hydrus schistosus*, is incredibly numerous in the Bay of Bengal, at Pinang and Singapore, far more so than any known terrestrial serpent. The fishing nets are hardly ever worked, but that one or more are among the contents. The other six species are of rare occurrence at Pinang and Singapore, as will be perceived from the disproportionally small number of each, examined during four years, viz. of *Laticauda scutata* : 3 ; *Hydrus striatus* : 2 ; *nigrocinctus* : 6 ; *gracilis* : 7 ; *pelamidoides* : 4 ; *pelamis* : 1.—Of these *Laticauda scutata* is excessively numerous in Timor, *Hydrus pelamis* in New Guinea, the Molucca Islands, and Otaheite, where the natives use it as an article of food. The remaining species, as far as is known, have been observed nowhere in such overwhelming numbers. Large individuals of every species are very seldom seen, it is the young individuals which frequent the coasts, and it appears to be questionable, if even the largest observed are animals arrived at their full size. The large individuals are very ferocious ; the young ones are less so. Fortunately for the fishermen the light blinds these serpents, which when out of their proper element, become very sluggish and soon expire. This accounts for the safety of the class of men, whose daily calling brings

them in immediate contact with animals, the wound of which is fatal. The fishermen in the straits of Malacca are aware of their danger, and therefore take care to avoid or destroy these reptiles while landing the fishes. The Malays denominate them "*Ular laut*," i. e. serpents of the sea, among which, however, the innocuous *Acrochordus granulatus*, (Schneider) is also comprised as an inhabitant of the coasts.

## BATRACHIA.

### FAM. CÆCILIDÆ, BONAPARTE.

#### GEN. ICHTHYOPHIS, Fitzinger, 1826.

(*Epicrion*, Wagler, 1828.)

Head depressed, elongated; muzzle obtuse; maxillary and palatine teeth slender, pointed and couched backwards; tongue entire with velvety surface; eyes distinct, below and a little in front of which a fosset with a minutely tentaculated border; body subfusiform with numerous close circular folds.

#### ICHTHYOPHIS GLUTINOSUS (Linné) VAR?

Of a uniform sooty brown, paler on the lower surface. Circular folds 254, of which 8 are caudal.

HABIT.—*Singapore*.

The transversal diameter, taken at the occiput, is nearly equal to that of the root of the tail, and but little less than the uniform diameter of the trunk, which is between the 24th and 25th part of the entire length. Compared with a specimen of *Ichthyophis glutinosus*, (Linné,) the present is of a more robust make; the head is shorter, the muzzle blunter, and the transversal distance between the nostrils greater. The apex of the tongue and the arches formed by the teeth are broader, more rounded. The palatal and upper maxillary teeth are blunter, and appear less recurved. Those of the lower jaw, the largest, present an appearance as if each was composed of two distinct parts: a lower which is vertical, broadly triangular, the posterior margin of which supports the upper part, which is curved backwards, and with rounded apex. The circular folds of the skin are fewer, more distant, and with the exception of the 3 or 4 anterior ones, complete. They are dis-

posed in a manner similar to that of *Ichthyophis glutinosus*. The crowded imbricate scales appear to be of a somewhat rectangular form, less rounded than in *I. glutinosus*: in both their surface presents a minute net-work. The fosset of the upper lip is situated in the centre of a small tubercle. The circumference of the fosset is provided with a very short, minute, membranous tube, which, however, after the animal for some years has been preserved in spirits of wine, can scarcely any longer be distinguished.

Length of the head, . . . . .  $0\frac{3}{8}$  inch.

Ditto ditto trunk, . . . . .  $10\frac{1}{8}$

Ditto ditto tail, . . . . .  $0\frac{2}{8}$

Entire length, . . . . .  $10\frac{6}{8}$  inch.

Circumference of the neck, 1, of the trunk,  $1\frac{2}{8}$ , of the root of the tail,  $\frac{5}{8}$  inch.

A single individual was observed by Dr. Montgomerie at Singapore in 1843, in whose garden it was turned up with the earth, from about two feet below the surface, and from whom I received the specimen, shortly after it had been killed. Although, as stated, it differs in colours and in other characters from the description given by M. M. Duméril and Bibron of *Ichthyophis glutinosus* (*Epicrion glutinosum*, Wagler, apud D. and B.) as well as from a specimen  $10\frac{2}{8}$  inch in length, from Assam, the data appear to me insufficient with certainty to determine, whether the present is a distinct species, or a variety of *Ichthyophis glutinosus*, (Linné.)

FAM. RANIDÆ, BONAPARTE.

GEN. RANA, Linné.

Skin smooth, hinder extremities very long, formed for leaping; toes palmated; teeth in the upper jaw, and in the palate.

RANA LESCHENAULTI, Dum. and Bibr.

A line of minute conical tubercles along the sides of the body and across the throat. Above uniformly chocolate-coloured; beneath and on the innerside of the extremities white, more or less vermiculated with pale brown. Iris narrow golden, rhomboidal, the two lower sides not joining each other, but leaving a small open space between them. Web of the toes orange with purple spots.

HABIT.—*Malayan Peninsula.*

Pondicherry, Bengal.

The marbled appearance of the upper parts, described by M. M. Duméril and Bibron, does not exist during life, but is acquired when the frog is immersed in alcohol. The species is apparently not numerous. Of two the larger was of the following dimensions :

|                                           |                      |
|-------------------------------------------|----------------------|
| Length of the head, . . . . .             | $0\frac{7}{8}$ inch. |
| Ditto ditto trunk, . . . . .              | $1\frac{6}{8}$       |
| Ditto ditto anterior extremity, . . . . . | $1\frac{4}{8}$       |
| Ditto ditto posterior, . . . . .          | $3\frac{6}{8}$       |

*Rana bengalensis*, Gray, *Illustr. Ind. Zool.* is perhaps intended to represent this species.

#### RANA TIGRINA, Daudin.

SYN.—*Rana tigrina*, Daudin. *Hist. nat. Gren. &c.* p. 64, Pl. 20.

*Rana mugiens*, Daudin. l. c. Pl. 23.

*Rana mugiens*, Latreille. *Hist. Rept. F.* 2, p. 153, Fig. 2.

*La grenouille taureau*, Cuvier, *R. A.*, 1. Ed.

*Rana tigrina*, Merrem.

*Rana limnocharis*, Boie, MS.

*Rana cancrivora*, Boie, MS.

*Rana cancrivora*, Gravenhorst.

*Rana picta*, Gravenhorst.

*Rana brama*, Lesson.

*Rana rugulosa*, Wiegmann.

*Rana vittigera*, Wiegmann.

*Rana cancrivora*, Tschudi.

*Rana tigrina*, apud Duméril and Bibron.

“Kodók, Kátak, Laucha” of the Malays.

Body and limbs above golden greyish-olive or brown, in some with large rounded black spots, and with a yellow line from the muzzle down the back, and a similar broad band from the side of the muzzle to the loins. Beneath and on the innerside of the limbs white or yellow, with or without black spots. Iris burnished golden, the lower half sometimes black, pupil elliptical rhombic.

HABIT.—*Malayan Peninsula and Islands.*

Coromandel, Bengal, Assam, Tenasserim, Java, Sumatra, Timor, Philippines, Canton Province.

The species is excessively numerous in valleys and hills, after heavy falls of rain, but adult individuals are of comparatively rare occurrence

At night the deep short baying sound denotes its presence. The largest individual measured :

|                                             |                       |
|---------------------------------------------|-----------------------|
| Length of the head, . . . . .               | 1 $\frac{4}{8}$ inch. |
| Ditto ditto trunk, . . . . .                | 3 $\frac{4}{8}$       |
| Ditto ditto anterior extremities, . . . . . | 2 $\frac{4}{8}$       |
| Ditto ditto posterior, . . . . .            | 7 $\frac{4}{8}$       |

GEN. MEGALOPHRYS, *Kuhl.*

Head very large, broader than the trunk, depressed ; rostral angle and upper eyelid elongated to a point. Tympanic membrane hidden. Nostrils lateral, below the rostral angle. Mouth enormous ; tongue circular, slightly notched behind. Posterior extremity with a short interdigital membrane.

MEGALOPHRYS MONTANA, Wagler, *Var.*

Above pale greyish brown, with a small black triangular tubercle on each shoulder, and a similar in the centre of the sacrum. From the sides of the muzzle a black band edged with white, continued round the orbit, and then downwards, obliquely over the dark brown cheeks. Outside of the limbs indistinctly marked with black. On the elbows, knees and heels a large round black spot. Posterior margin of the limbs rose-coloured. Fingers and toes yellowish white with transverse black bands. Palms and soles black. Throat and chest sooty with a large white blotch on each side of the latter. Abdomen and inner side of the limbs sooty, vermiculated and spotted with white. Iris rich golden brown, with minute black net-work. Pupil vertically rhomboidal.

HABIT.—*Pinang.*

Wagler's short description of *M. montana* is drawn up from a preserved specimen, which apparently is also the case with that communicated in *Erpétologie Générale*. From the latter the present animal differs both in colours and in the following particulars. The muzzle forms a pointed lobe resembling the upper eyelids, but smaller. The nostrils are transversely oval, protected by a membranous valve fixed to their lower margin. The upper eyelids are perfectly smooth. The nearly vertical cheeks are above bordered by an angular ridge terminating near the shoulder ; behind by a short curved ridge, which at the angle of the mouth forms a small pointed lobe. The back is smooth without transversal folds, but bordered on each side by a sharp whitish ridge commencing at the upper eyelid, converging towards the



cloacal orifice. On the shoulder, near the triangular tubercle, the ridge is enclosed between two short black lines.

Two males were at different times captured on the Pentland Hills, at an elevation of about 1800 ft. One was found in a dark room, where it was observed remaining motionless during several successive days. Its forms and colours caused it at first to be mistaken for a withered leaf. The second was taken on a tree. The iris is vertically contracted by exposure to the light. The male has no vocal sacs. The larger was of the following dimensions :

|                                             |                      |
|---------------------------------------------|----------------------|
| Length of the head, . . . . .               | $0\frac{7}{8}$ inch. |
| Ditto ditto trunk, . . . . .                | $1\frac{7}{8}$       |
| Ditto ditto anterior extremities, . . . . . | 2                    |
| Ditto ditto posterior, . . . . .            | $3\frac{2}{8}$       |

#### FAM. HYLIDÆ.

##### GEN. LIMNODYTES,\* *Duméril and Bibron.*

Tongue long, narrowed in front, widened, forked, free behind ; teeth on the vomer forming two groups, between the internal openings of the nostrils ; tympanum distinct ; Eustachian tubes middling ; four fingers free ; toes completely or partially webbed ; sub-digital disks slightly dilated ; process of the first os cuneiforme blunt, very minute ; males with vocal sacs ; sacral transversal processes not dilated.

##### LIMNODYTES ERYTHRÆUS, (Schlegel).

SYN.—*Hyla erythræa*, Schlegel.

*Hylarana erythræa* Tschudi.

*Limnodytes erythræus*, Duméril and Bibron.

Back and sides brown or reddish-olive ; a longitudinal silvery white band from the eye to the loin ; a second similar from the nostrils, parallel with the former. Beneath silvery white. The innerside of the extremities spotted and lineated with brown. Iris golden brown ; pupil vertically rhomboidal.

HABIT.—*Malayan Peninsula.*

Java, Arracan.

Of three individuals observed, the largest was of the following dimensions :

\* This denomination has with propriety been substituted for the inadmissible *Hylarana*, Tschudi.

|                                             |                      |
|---------------------------------------------|----------------------|
| Length of the head, . . . . .               | $0\frac{7}{8}$ inch. |
| Ditto ditto trunk, . . . . .                | $1\frac{6}{8}$       |
| Ditto ditto anterior extremities, . . . . . | $1\frac{6}{8}$       |
| Ditto ditto posterior, . . . . .            | $4\frac{2}{8}$       |

GEN. POLYPEDATES, *Tschudi, apud Duméril and Bibron.*

Terminal joints of the fingers and toes widened into a large disk ; fingers slightly webbed at their base ; Eustachian tubes large ; in other particulars resembling *Limnodytes*.

POLYPEDATES LEUCOMYSTAX, (Gravenhorst.)

SYN.—*Hyla maculata*, Gray, *Illust. Ind. Zool.*

*Hyla leucomystax*, Gravenhorst.

*Polypedates leucomystax*, *Tschudi, apud Duméril and Bibron.*

Upper parts changeable: buff, ashy grey, chocolate brown, tinged with rose-or lilae, minutely or largely spotted with black. Upper lips white. A blackish band occupying the sides of the head, from the muzzle to tympanum. Beneath whitish or grey, uniformly, or minutely dotted with black. Posterior surface of the thighs blackish or vermiculated with white. Iris silvery or buff; pupil horizontally rhomboidal.

HABIT.—*Pinang, Singapore, Malayan Peninsula.*

Malabar and Coromandel Coast, Bengal.

This species has the power of changing its colours as above described. Although it inhabits Singapore and the sultry plains of Bengal, it appears not to occur in the valleys at Pinang, but to affect the hills, at an elevation of more than 2000 ft., with a mean annual temperature of about  $71^{\circ}$

|                                             |                      |
|---------------------------------------------|----------------------|
| Length of the head, . . . . .               | $0\frac{6}{8}$ inch. |
| Ditto ditto trunk, . . . . .                | $1\frac{6}{8}$       |
| Ditto ditto anterior extremities, . . . . . | $1\frac{6}{8}$       |
| Ditto ditto posterior, . . . . .            | $4\frac{1}{8}$       |

FAM. BUFONIDÆ, FITZINGER.

GEN. BUFO, *Laurenti.*

Body inflated ; skin warty ; parotids porous ; toes united by a rudimentary membrane ; no teeth.

BUFO MELANOSTICTUS, Schneider.

SYN.—*Bufo scaber*, Daudin.

*Bufo bengalensis*, Daudin.

Bufo scaber, Latreille.  
 Bufo scaber, Daudin, Hist. Rept.  
 Bufo bengalensis, Daudin, Hist. Rept.  
 Le Crapaud de Bengale, Lessou.  
 Bufo dubia, Shaw, apud Gray, Illustr. Ind. Zool.  
 Bufo carinatus, Gray, Illustr. Ind. Zool.  
 Bufo melanostictus, apud Gravenhorst.  
 Bufo scaber, Tschudi.  
 "Kákong," "Kátak púru," of the Malays of the Peninsula.

Above earthy brown, grey or buff, in some marbled with black; lips, parotids, crests of the head, points of the tubercles, and last joints of fingers and toes: sooty, or black. Beneath buff, in some vermiculated with black. Iris golden brown; pupil transversely rhombic.

HABIT.—*Malayan Peninsula and Islands.*

Java, Tenasserim, Bengal, Coromandel.

In the Malayan countries this species swarms in valleys and hills. It has in a slight degree the power of changing its colours, and it utters a chirping, plaintive sound. The largest individuals examined, measured—

|                                              |                |
|----------------------------------------------|----------------|
| Length of the head, . . . . .                | 1 inch.        |
| Ditto ditto trunk, . . . . .                 | 3              |
| Ditto ditto anterior extremities, . . . . .  | $2\frac{2}{8}$ |
| Ditto ditto posterior extremities, . . . . . | $4\frac{2}{8}$ |

#### GEN. *HYLÆDACTYLUS*, Tschudi.

Tongue an oval disk, thick, free only at the lateral margins. Palatal teeth. Eustachian tubes very minute. No parotids. Four free fingers with the terminal joint widened, truncated. Five toes united at the base by a very small membrane, the terminal joint not widened; sole with two soft tubercles between tarsus and metatarsus. Sacral transversal processes forming triangular palettes.

#### *HYLÆDACTYLUS BIVITTATUS*, N. S.

Upper parts and outside of extremities brownish olive with distant small black spots. Head from the muzzle to the middle of the orbit whitish. A broad whitish band edged with black from the posterior angle of the eye, along each side to the loins. A shorter, oblique, similar band from the posterior angle of the eye. Beneath whitish, vermiculated with brown. The throat of the males black. Iris golden brown; pupil transversally rhombic.

HABIT.—*Malayan Peninsula.*

From *H. baleatus*, Tschudi, the present species differs both in colours and in the following particulars. The profile from the nose to coccyx forms a considerable arch, the highest part of which is the centre of the back. The male is provided with a vocal sac, the large openings of which are situated on each side of the tongue, and their presence is easily detected by the laxity of the (black) skin of the throat, which forms a broad transversal fold. Between the small openings of the Eustachian tubes the palate presents a considerable transversal fold of the skin, the free margin of which is fringed, which gives it the appearance of a row of teeth. A similar fold has been observed by M. M. Duméril and Bibron in the genera *Plectropus*, Dum. and Bibr., and in *Uperodon*, Dum. and Bibr. In front of this fold is another smaller, between the orbital protuberances. Behind each of the large internal openings of the nostrils, is an arched bony ridge, which in *H. baleatus* supports a few teeth. In the only individual of the present species examined, the free margin of the ridge is cutting, but without teeth. Over the symphysis of the lower jaw there is a small pointed process, fitting into a corresponding cavity in the margin of the upper jaw. In this species no less than in *Uperodon marmoratum*, Dum. and Bibr. nearly the whole of the thigh is hidden by the skin of the body, so that the posterior extremities are free but from a little above the knees. This character does not appear to exist in *Hyle-dactylus baleatus*, as it is not mentioned in the description of that species by M. M. Duméril and Bibron. On the anterior part of the back appear some indistinct rounded elevations; the rest of the upper parts is smooth. The skin of the throat and abdomen presents numerous transversal wrinkles, and is covered with minute tubercles. The toes are more slender than the fingers, and their last joint, although flattened, is not so broad, as that of the fingers, which is of a somewhat triangular form, truncated in front. In *H. baleatus* the fingers are longer than the toes. In the present species however the longest finger, the third, is nearly one-fourth shorter than the fourth toe.

The only individual which I had an opportunity of examining, after its death, was a male taken in a field near Malacca. It was of the following dimensions:

|                               |                       |
|-------------------------------|-----------------------|
| Length of the head, . . . . . | 0 $\frac{3}{8}$ inch. |
| Ditto ditto trunk, . . . . .  | 2 $\frac{6}{8}$       |

|                                            |                 |
|--------------------------------------------|-----------------|
| In a straight line from the muzzle to coc- |                 |
| cyx, following the arch of the back, . .   | 3 $\frac{1}{8}$ |
| Length of the anterior extremities, . . .  | 1 $\frac{6}{8}$ |
| Ditto ditto posterior extremities, follow- |                 |
| ing the posterior margin, . . . . .        | 2 $\frac{7}{8}$ |

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In the nomenclature adopted in the preceding Catalogue it has been my wish strictly to adhere to the Rules proposed by the Committee of the British Association for the Advancement of Science, published in the *Report of the twelveth Meeting*, Rules with which I regret I was unacquainted before the publication of the Catalogue of Malayan Mammalia.

I have to acknowledge my sense of obligation to the Hon'ble Sir William Norris, late Recorder of H. M. Court of Judicature in the Straits of Malacca, to W. T. Lewis, Esq. Asst. Res. Councillor, Prince of Wales Island, to W. Montgomerie, Esq., M. D. late Senior Surgeon, Straits of Malacca, and to Capt. Congalton, H. C. Steamer Hooghly for their assistance, to me so much more acceptable, as the limited leisure left me by the superintendence of six Hospitals in Prince of Wales Island, and a seventh in Province Wellesley, was latterly curtailed by additional, extra-professional duties, imposed upon me by the present local head authority in the Straits.

Fort William, June 1st, 1847.

#### EXPLANATION OF THE PLATES.

PL. XX. *Dilophyrus grandis*, Gray.—(Natural size).

PL. XL. FIG. 1. *Calanaria longiceps*, Cantor.—(Magnified.)

FIG. 2. *Lycodon effrænis*, Cantor.—(Magnified.)

FIG. 3. *Dipsas boa*, (H. Boie.)—(Natural size).

FIG. 4. *Homalopsis hydrina*, Cantor.—(Natural size).

FIG. 5. *Homalopsis leucobalia*, Schlegel, *Var.*—(Natural size).

FIG. 6. *Elaps melanurus*, (Shaw)—(Natural size).

FIG. 7. *Elaps nigromaculatus*, Cantor.—(Natural size).

FIG. 8. *Hydrus nigrocinctus*, (Daudin.) *Var* ?—(Natural size).

FIG. 9. *Trionocephalus sumatranus*, (Raffles.) *Var.*—(Natural size).

#### ADDENDA.

P. 609. To SYN. *Emys crassicolis*, Bell, add: apud Horsfield: Life of Raffles.

P. 614. To *Gymnopus gougeticus*, (Cuv.) add: SYN. *Trionyx ocellatus*, Hardwicke (Young), apud Jaquemont: Atlas: Pl. 9.

P. 622 To SYN. *Crocodylus biporcatus*, Cuv. add: apud Horsfield: l. c.

P. 903. To SYN. *Python des îles de la Sonde*, add: Cuvier, R. A.



## LATITUDINAL DISTRIBUTION OF REPTILES

*Inhabiting the Malayan Peninsula and Islands and other Localities.*

[*Sp.* prefixed to localities signifies that they are inhabited by *species* of which varieties occur in Malayan countries.]

## CHELONIA.

|                                               |                               |                                                                             |
|-----------------------------------------------|-------------------------------|-----------------------------------------------------------------------------|
| 1 <i>Geoemyda spiuosa</i> , Gray.             | Pinang.                       | Sumatra.                                                                    |
| 2 <i>Emys crassicollis</i> , Bell, ms.        | Pinang, Malayan Peninsula.    | Sumatra, Java.                                                              |
| 3 <i>Emys platynota</i> , Gray.               | Pinang, Malayan Peninsula.    | Sumatra.                                                                    |
| 4 <i>Emys trivittata</i> , Dum. & Bibr.       | Pinang, Malayan Peninsula.    | Bengal, Assam.                                                              |
| 5 <i>Cistudo amboinensis</i> , (Dand.)        | Singapore, Malayan Peninsula. | Java, Amboina, Philippines, Tenasserim Provinces.                           |
| 6 <i>Tetraonyx affinis</i> , Cantor.          | Pinang.                       |                                                                             |
| 7 <i>Gymnopus gangeticus</i> , (Cuv.)         | Pinang, Malayan Peninsula.    | Rivers and Bay of Bengal.                                                   |
| 8 <i>Gymnopus cartilagineus</i> , (Boddaert.) | Pinang, Malayan Peninsula.    | Java, Dukhun, "India," "China."                                             |
| 9 <i>Gymnopus indicus</i> , (Gray.)           | Pinang, Malayan Peninsula.    | Rivers of India, Philippines.                                               |
| 10 <i>Chelonia virgata</i> , Schweigger.      | Malayan Seas.                 | Teneriffe, Rio Janeiro, Cape of Good Hope, New York, Indian Ocean, Red Sea. |
| 11 <i>Chelonia imbricata</i> , (Linné.)       | Malayan Seas.                 | Atlantic and Indian Ocean.                                                  |
| 12 <i>Chelonia olivacea</i> , Eschscholtz.    | Malayan Seas.                 | Bay of Bengal, China Sea.                                                   |

## SAURIA.

|                                                          |                                       |                                                              |
|----------------------------------------------------------|---------------------------------------|--------------------------------------------------------------|
| 1 <i>Crocodylus vulgaris</i> , Cuv. Var. B, Dum. & Bibr. | Malayan Peninsula & Islands.          | Java, Sumatra, Tenasserim, Bengal, Coromandel, Malabar.      |
| 2 <i>Crocodylus porosus</i> , Schneider.                 | Pinang, Singapore, Malayan Peninsula. | Seychelle Islands, Timor, Java, Sumatra, Tenasserim, Bengal. |
| 3 <i>Platydictylus lugubris</i> , Dum. and Bibr.         | Pinang.                               | Otaheite.                                                    |
| 4 <i>Platydictylus gecko</i> , (Linné.)                  | Malayan Peninsula.                    | Philippines, Java, Tenasserim, Burmah, Bengal, Coromandel.   |
| 5 <i>Platydictylus tentor.</i> Cantor.                   | Pinang.                               |                                                              |

|    |                                                                                                                   |                                     |                                                                                      |
|----|-------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------|
| 6  | <i>Platydactylus monarchus</i> , Schlegel.                                                                        | Pinang, Singapore, Malay Peninsula. | Philippines, Amboina, Borneo.                                                        |
| 7  | <i>Ptychozoon homalocephalum</i> , (Creveld.)                                                                     | Pinang, Singapore.                  | Ramree Island (Arracan).                                                             |
| 8  | <i>Hemidactylus peronii</i> , Dum. and Bibr.                                                                      | Pinang.                             | Isle of France.                                                                      |
| 9  | <i>Hemidactylus coctæi</i> , Dum. and Bibr.                                                                       | Pinang.                             | Bengal, Bombay.                                                                      |
| 10 | <i>Hemidactylus frenatus</i> , Schlegel, ms.                                                                      | Pinang, Singapore, Malay Peninsula. | Amboina, Timor, Java, Marian Isles, Ceylon, Bengal, Assam, South Africa, Madagascar. |
| 11 | <i>Hemidactylus platyurus</i> , (Schneider.)                                                                      | Pinang.                             | Philippines, Borneo, Java, Bengal, Assam.                                            |
| 12 | <i>Gymnodactylus pulchellus</i> , (Gray.)                                                                         | Pinang, Singapore.                  |                                                                                      |
| 13 | <i>Varanus nebulosus</i> , Dum. and Bibr.                                                                         | Pinang.                             | Java, Siam, Bengal.                                                                  |
| 14 | <i>Varanus flavescens</i> , (Gray.)                                                                               | Pinang.                             | Bengal, Nipal.                                                                       |
| 15 | <i>Varanus salvator</i> , (Laurenti.)                                                                             | Pinang, Malay Peninsula.            | Philippines, Moluccas, Amboina, Java, Bengal, Assam.                                 |
| 16 | <i>Bronchocela cristatella</i> , (Kuhl.)                                                                          | Pinang, Singapore, Malay Peninsula. | Amboina, Island of Buru, Java, Sumatra.                                              |
| 17 | <i>Lophyrus armatus</i> , (Gray.)                                                                                 | Pinang, Singapore.                  | Cochin-China.                                                                        |
| 18 | <i>Dilophyrus grandis</i> , Gray.                                                                                 | Pinang.                             | Rangoon.                                                                             |
| 19 | <i>Draco volans</i> , (Linné.)                                                                                    | Pinang, Singapore, Malay Peninsula. | Philippines, Borneo, Java.                                                           |
| 20 | <i>Draco maculatus</i> , (Gray.)                                                                                  | Pinang.                             | Tenasserim.                                                                          |
| 21 | <i>Leiolepis bellii</i> , (Gray.)                                                                                 | Pinang, Malay Peninsula.            | Cochin-China.                                                                        |
| 22 | <i>Eumeces punctatus</i> , (Linné.) Var.                                                                          | Pinang, Singapore, Malay Peninsula. | Sp. Coromandel, Malabar, Bengal.                                                     |
| 23 | <i>Euprepis rufescens</i> , (Shaw.)<br>Var. D, Dum. and Bibr.<br>Var. E, Dum. and Bibr.<br>Var. F, Dum. and Bibr. | Pinang, Singapore, Malay Peninsula  | Sp. Sandwich Islands, Philippines, Timor, Celebes, Borneo, Java, Coromandel, Bengal. |
| 24 | <i>Euprepis ernstii</i> , Dum. and Bibr.                                                                          |                                     |                                                                                      |
| 25 | <i>Lygosoma chalcides</i> , (Linné.)                                                                              | Pinang, Singapore.                  | Java.                                                                                |

## OPHIDIA.

## INNOCUOUS.

|                                                                                  |                                                                                    |                                                                                                                  |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| 1 <i>Polidion lineatum</i> , (Boie.)                                             | Pinang, Singapore.                                                                 | Java.                                                                                                            |
| 2 <i>Typhlops nigro-albus</i> , Dum. and Bibr.                                   | Pinang, Singapore.                                                                 | Sumatra.                                                                                                         |
| 3 <i>Typhlops braminus</i> , (Daudin.)*                                          | Pinang, Singapore, Malay Peninsula                                                 | Canton-Province, Philippines, Guam (Marian Isles), Java, Tenasserim, Bengal, Assam, Coromandel, Ceylon, Malabar. |
| 4 <i>Cylindrophis rufus</i> , (Lacert.)                                          | Singapore                                                                          | Java, Tranquebar, Bengal?                                                                                        |
| 5 <i>Xenopeltis unicolor</i> , Remwardt.                                         | Pinang, Singapore, Malay Peninsula.                                                | Celebes, Java, Sumatra.                                                                                          |
| 6 <i>Python reticulatus</i> , (Schneider.)                                       | Malayan Peninsula & Islands.                                                       | Chusan? Amboina. Java, Banka, Sumatra, Bengal?                                                                   |
| 7 <i>Acrochordus javanicus</i> , Hornstedt.                                      | Pinang, Singapore.                                                                 | Java.                                                                                                            |
| 8 <i>Acrochordus granulatus</i> , (Schneider.)                                   | Rivers and Sea of the Malay Peninsula and Islands.                                 | Bay of Manilla, New-Guinea, Timor, Java, Sumatra, Coromandel.                                                    |
| 9 <i>Calamaria lumbricoidea</i> , Schlegel, Var.                                 | Pinang, Singapore.                                                                 | Sp. Celebes, Java.                                                                                               |
| 10 <i>Calamaria linnei</i> , Boie, Var. Schlegel.                                | Pinang.                                                                            | Java.                                                                                                            |
| 11 <i>Calamaria longiceps</i> , Cantor.                                          | Pinang.                                                                            |                                                                                                                  |
| 12 <i>Calamaria sagittaria</i> , Cantor.                                         | Malayan Peninsula.                                                                 | Bengal, Assam.                                                                                                   |
| 13 <i>Coronella baliodeira</i> , Schlegel.                                       | Pinang.                                                                            | Java.                                                                                                            |
| 14 <i>Xenodon purpurascens</i> , Schlegel.                                       | Pinang.                                                                            | Java, Tenasserim. Var. Clirra Punji, Assam, Darjeling, Midnapore (Bengal)                                        |
| 15 <i>Lycodon aulicus</i> , (Linné.)<br>Var. A,<br>Var. B,<br>Var. C,<br>Var. D, | Pinang.<br>Pinang.<br>Pinang, Malay Pen.<br>Pinang, Malay Pen.<br>Malay Peninsula. | Bengal, Coromandel.<br>Bengal.<br>Java, Tenasserim.<br>Pulo Samao, Timor.<br>Bengal.                             |
| 16 <i>Lycodon platurinus</i> , (Shaw.)                                           | Pinang.                                                                            | Java, Bengal?                                                                                                    |
| 17 <i>Lycodon effraenis</i> , Cantor.                                            | Pinang.                                                                            |                                                                                                                  |
| 18 <i>Coluber fasciolatus</i> , Shaw.                                            | Malayan Peninsula.                                                                 | Coromandel.                                                                                                      |

|    |                                                                             |                                                                            |                                                                                                                                                                       |
|----|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19 | <i>Coluber radiatus</i> , Schlegel.                                         | Pinang, Singapore.<br>Malayan Peninsula.                                   | Java, Sumatra, Cochin-China, Tenasserim, Assam.                                                                                                                       |
| 20 | <i>Coluber korros</i> , Reinwardt.                                          | Pinang, Singapore,<br>Malayan Peninsula.                                   | Java, Sumatra, Arracan, Tenasserim.                                                                                                                                   |
| 21 | <i>Coluber hexagonotus</i> , Cantor.                                        | Pinang.                                                                    |                                                                                                                                                                       |
| 22 | <i>Dipsas dendrophila</i> , Reinwardt.                                      | Pinang, Singapore,<br>Malayan Peninsula.                                   | Celebes, Java.                                                                                                                                                        |
| 23 | <i>Dipsas multinaculata</i> , Schlegel.                                     | Pinang, Malayan Peninsula.                                                 | Celebes, Java, Tenasserim, Bengal.                                                                                                                                    |
| 24 | <i>Dipsas cynodon</i> , Cuvier.                                             | Pinang, Malayan Peninsula.                                                 | Java, Tenasserim.                                                                                                                                                     |
| 25 | <i>Dipsas boa</i> , Boie.                                                   | Pinang.                                                                    | Java.                                                                                                                                                                 |
| 26 | <i>Herpetodryas oxycephalus</i> , (Reinwardt.)                              | Pinang.                                                                    | Celebes, Java.                                                                                                                                                        |
| 27 | <i>Dryinus prasinus</i> , (Reinwardt.)<br><br>Var. A,<br>Var. B,<br>Var. C, | Malayan Peninsula & Islands.<br><br>Same localities.<br>Pinang.<br>Pinang. | Celebes, Java, Cochin-China, Siam, Burmah, Tenasserim, Arracan, Bengal, Assam.<br>Same localities.                                                                    |
| 28 | <i>Leptophis pictus</i> , (Gmelin)<br><br><br>Var. A,                       | Malayan Peninsula & Islands.<br><br><br>Malayan Peninsula.                 | Manilla, New Ireland, Waigiou, Amboina, New-Guinea, Pulo Samao, Java, Sumatra, Cochin-China, Tenasserim, Burmah, Bengal, Assam, Coromandel.<br>Bengal, Assam, Ceylon. |
| 29 | <i>Leptophis caudatilineatus</i> , Cantor.                                  | Pinang, Singapore.                                                         |                                                                                                                                                                       |
| 30 | <i>Leptophis ornatus</i> , (Shaw.)<br>Var.                                  | Pinang, Malayan Peninsula.                                                 | Sp. Bengal, Ceylon.<br>Java, Sumatra, Tenasserim, Arracan.                                                                                                            |
| 31 | <i>Tropidonotus umbratus</i> , (Daudin.)<br>Var.                            | Malayan Peninsula & Islands.                                               | Sp. Bengal, Assam, Coromandel, Ceylon.<br>Java, Bengal.                                                                                                               |
| 32 | <i>Tropidonotus stolatus</i> , (Linne)                                      | Pinang, Malayan Peninsula.                                                 | Philippines, Tenasserim, Bengal, Assam, Nipal, Coromandel, Ceylon, Bombay.                                                                                            |
| 33 | <i>Tropidonotus schistosus</i> , (Daudin.)<br>Var.                          | Malayan Peninsula.<br>Same locality.                                       | Philippines, Tenasserim, Bengal, Madagascar.<br>Same localities.                                                                                                      |
| 34 | <i>Tropidonotus cerasogaster</i> , (Cantor.)                                | Malayan Peninsula.                                                         | Bengal, Assam.                                                                                                                                                        |

|    |                                                      |                                           |                                                                                     |
|----|------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| 35 | <i>Tropidonotus juvencus</i> , Cant.                 | Pinang.                                   |                                                                                     |
| 36 | <i>Homalopsis chinchops</i> , (Schneider.)           | Malayan Peninsula & Islands.              | New-Guinea, Amboina, Timor, Sarapua, Java, Sumatra, Tenasserim, Bengal, Coromandel. |
| 37 | <i>Homalopsis buccata</i> , (Linné.)                 | Pinang, Malayan Peninsula.                | Java.                                                                               |
| 38 | <i>Homalopsis sieboldi</i> , Schlegel.               | Malayan Peninsula.                        | Bengal.                                                                             |
| 39 | <i>Homalopsis enhydria</i> , (Schneider.)            | Malayan Peninsula & Islands.              | Java, Tenasserim, Bengal, Coromandel.                                               |
| 40 | <i>Homalopsis plumbea</i> , Boie.                    | Pinang.                                   | Java                                                                                |
| 41 | <i>Homalopsis leucobalia</i> , Schlegel, <i>Var.</i> | Pinang, Malayan Peninsula.                | <i>Sp.</i> Timor.                                                                   |
| 42 | <i>Homalopsis hydrina</i> , Cantor.                  | Sea off Pinang and the Malayan Peninsula. |                                                                                     |

## VENOMOUS.

|          |                                                      |                                       |                                                                                                                                                     |
|----------|------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 43 I.    | <i>Elaps melanurus</i> , (Shaw.)                     | Malayan Peninsula.                    | Tenasserim, Nerva, (Coromandel.)                                                                                                                    |
| 44 II.   | <i>Elaps intestinalis</i> , (Latreille.) <i>Var.</i> | Pinang, Singapore, Malayan Peninsula  | <i>Sp.</i> Java, Malwah, (Central India.)                                                                                                           |
| 45 III.  | <i>Elaps nigromaculatus</i> , Cantor.                | Pinang, Singapore.                    |                                                                                                                                                     |
| 46 IV.   | <i>Elaps bivirgatus</i> , Kuhl, <i>Var.</i>          | Pinang, Malayan Peninsula.            | <i>Sp.</i> Java, Sumatra.                                                                                                                           |
| 47 V.    | <i>Bungarus flaviceps</i> , J. Reinhardt.            | Pinang.                               | Java.                                                                                                                                               |
| 48 VI.   | <i>Bungarus candidus</i> , (Linné.)                  | Malayan Peninsula.                    | Java, Tenasserim, Bengal, Assam, Coromandel, Ceylon, Malabar.                                                                                       |
| 49 VII.  | <i>Bungarus fasciatus</i> , (Schneider.)             | Pinang, Malayan Peninsula.            | Java, Tenasserim, Bengal, Coromandel.                                                                                                               |
| 50 VIII. | <i>Hamadryas ophiophagus</i> , Cantor.               | Pinang, Singapore, Malayan Peninsula. | Java, Sumatra, Bengal, Assam, Coromandel.                                                                                                           |
| 51 IX.   | <i>Naja lutescens</i> , Latreille.                   |                                       | <i>Sp.</i> Countries between the Sutledj and Cape Comorin, Ceylon, Hindoostan to Cape Romania, Sumatra, Java, Ternate, Borneo, Philippines, Chusan. |
|          | <i>Var. D.</i> (Daudin.)                             | Pinang, Singapore, Malayan Peninsula  | Bengal, Coromandel.                                                                                                                                 |
|          | <i>Var. nigra</i> ,                                  | Pinang, Singapore.                    |                                                                                                                                                     |



|    |                                                         |                                                                 |                                                                                                                                               |
|----|---------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 52 | X. <i>Trigonocephalus gramineus</i> , (Shaw.)           | Pinang, Singapore, New Holland, Timor, Pulo Malayana Peninsula. | Samao, Celebes, Eastern Java, Banka, Sumatra, Tenasserim, Bengal, Chirra Punji, Nipal, Coromandel, Ceylon.                                    |
|    | Var.                                                    | Pinang, Singapore, Malayana Peninsula.                          | Sumatra, Tenasserim.                                                                                                                          |
| 53 | XI. <i>Trigonocephalus sumatranus</i> , (Raffles.) Var. | Pinang, Singapore, Malayana Peninsula.                          | Sp. Sumatra.                                                                                                                                  |
| 54 | XII. <i>Trigonocephalus puniceus</i> , Reinwardt.       | Pinang, Singapore, Malayana Peninsula.                          | Java.                                                                                                                                         |
| 55 | XIII. <i>Laticauda scutata</i> , Laurenti.              | Sea of the Malayana Peninsula and Islands.                      | Bay of Bengal, Sea of Timor, Celebes, Molucca, and Liewkiew Islands, New Guinea, Tongataboo, China Sea.                                       |
| 56 | XIV. <i>Hydrus striatus</i> , (Lacépède.)               | Sea of Pinang, Malayana Peninsula.                              | Sea of Liewkiew Islands, Timor, Sumatra, Bay of Bengal.                                                                                       |
| 57 | XV. <i>Hydrus nigrocinctus</i> , (Daudin.)              | Sea of Pinang, Singapore, Malayana Peninsula.                   | Bay of Bengal, estuaries of the Gauges.                                                                                                       |
|    | Var. ?                                                  | Sea off Pinang.                                                 |                                                                                                                                               |
| 58 | XVI. <i>Hydrus gracilis</i> , Shaw.                     | Sea of Malayana Peninsula and Islands.                          | Bay of Bengal, Malabar, Sumatra, Bornco.                                                                                                      |
| 59 | XVII. <i>Hydrus schistosus</i> , (Daudin.)              | Sea of Malayana Peninsula and Islands.                          | Bay of Bengal, Malabar, Sumatra.                                                                                                              |
| 60 | XVIII. <i>Hydrus petamoides</i> , (Schlegel.)           | Sea of Malayana Peninsula and Islands.                          | Bay of Bengal, Sea of Celebes, Molucca Islands, China Sea.                                                                                    |
| 61 | XIX. <i>Hydrus bicolor</i> , (Schnneider.)              | Sea of Malayana Peninsula.                                      | Bay of Bengal, Sea of Sumatra, Java, Celebes, Moluccas, China Sea (to 27° N. L.) Otaheite, Bay of Port Jackson (33° 55' S. L. 151° 25' E. L.) |

## BATRACHIA.

|   |                                                    |                                 |                                                                                            |
|---|----------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------|
| 1 | <i>Ichthyophis glutinosus</i> , (Linnaeus.) Var. ? | Singapore.                      | Sp. Java, Ceylon, Assam.                                                                   |
| 2 | <i>Rana leschenaulti</i> , Dnm. and Bibr.          | Malayana Peninsula.             | Bengal, Pondicherry.                                                                       |
| 3 | <i>Rana tigrina</i> , Daudin.                      | Malayana Peninsula and Islands. | Coromandel, Bengal, Assam, Tenasserim, Java, Sumatra, Timor, Philippines, Canton Province. |

|   |                                                    |                                          |                                          |
|---|----------------------------------------------------|------------------------------------------|------------------------------------------|
| 4 | <i>Megatophrys montana</i> , Wag-<br>ler, Var.     | Pinang.                                  | Sp. Java.                                |
| 5 | <i>Limnodytes erythraeus</i> ,<br>(Schlegel.)      | Malayan Peninsula.                       | Java, Tenasserim, Arracan.               |
| 6 | <i>Polypedates teucomystax</i> ,<br>(Gravenhorst.) | Pinang, Singapore,<br>Malayan Peninsula. | Bengal, Coromandel, Mala-<br>bar.        |
| 7 | <i>Bufo melanostictus</i> , Schnei-<br>der.        | Malayan Peninsula<br>and Islands.        | Java, Tenasserim, Bengal,<br>Coromandel. |
| 8 | <i>Hylodactylus bivittatus</i> ,<br>Cantor.        | Malayan Peninsula.                       |                                          |

## ALTITUDINAL DISTRIBUTION OF REPTILES

### INHABITING THE MALAYAN PENINSULA AND ISLANDS, AND OTHER LOCALITIES.

[The extra-Malayan localities have necessarily been confined to such of which the elevation has been specified by authors, the Malayan are given from personal observation.]

PRINCE OF WALES ISLAND (PULO PINANG), 5° 25' N. L. 100° 19' E. Valley: Mean annual temperature: 80° 03 Fahr. Average monthly range of the thermometer: 11°; greatest daily range: 13°. Annual quantity of rain: 65.5 inch. (145 days).

Hills. Granite. Highest elevation (*Western Hill*) 2,500 ft. Mean annual temperature 71°. Average monthly range of the thermometer 10°; greatest daily range 9°. Annual quantity of rain: 116.6 inch (174 days). Vegetation even for a tropical distinguished by luxuriance, beauty and variety. Characteristic features: Filices. (*Alsophila contaminans*, Wal.—*Schizæa dichotoma*,—*Neuroplatyceros* (*Acrostichum*) *biforme*, Desvontaine. *Polypodium horsfieldii*, Bennett.)

Pandanaceæ. (*Freycinetia*).

Taccaceæ. (*Tucca cristata*, Jack).

Palmaeæ. (*Areca catechu*, Willd. *Arenga saccharifera*, Labill. *Nipa fruticosa*. *Euoplys tigillaria*, Jack. "Pinang Lawyer" \* *Calamus*).

Scitamineæ. (*Hedygium sumatranum*, Jack. *Amomum biflorum*, Jack).

Orchidaceæ.

Taxaceæ. (*Dacrydium*. *Podocarpus*).

Gnetaceæ. (*Gnetum gnemon*. *Gnetum brunonianum*).

Artocarpeæ. (*Phytocrene palmata*, Wal. *Phytocrene bracteata*,† Wal.)

Nepentheæ. (*Nepenthes distillatoria*. *Nepenthes anpullaria*, Jack).

Gesneraceæ. (*Didymocarpus crinitus*, Jack).

Euphorbiaceæ.

Corylaceæ. (*Quercus racemosa*, Jack. *Lithocarpus javensis*, Blume).

An undescribed dwarf palm, hitherto supposed to be confined to the hills of Pinang. Sir William Norris found it on Mount Ophir in 1847.

† This species appears to be confined to the lower parts of the hills and the valleys.

Begoniaceæ. (*Begonia orbiculata*, Jack).

Sterculiaceæ. (*Sterculia coccinea*, Roxburgh. *Dario Zibethinus*, Lin.)

Dipteraceæ. (*Dipterocarpus*).

Aurantiaceæ. (*Murraya paniculata*, Loar).

Anacardiaceæ. (*Stagmaria verniciflua*, Jack).

Conmaraceæ. (*Eurycoma longifolia*, Jack).

Garciniæ.

Melastomaceæ. (*Melastoma braeteata*, Jack. *M. exigua*, Jack. *M. glauca*, Jack. *Sonerila moluccana*, Rob.)

Myrtaceæ.

SINGAPORE ISLAND, 1° 24' N. L. 104° E. Mean annual temperature, 80°. Greatest daily range of thermometer: 10°. Annual number of rainy days: 185. Surface gently undulating. Sand-stone hills, indicating remote convulsion; highest hill (*Bukit Timah*) 530 ft., granite. In the valleys occur vegetable and animal forms which at Pinang have been observed at or near the summit of the hills, but not in the plains. Thus at Singapore, occur *Alsophila*, *Schizæa*, *Tacca cristata*, *Gnetum*, *Nepenthes*, *Begonia*, *Eurycoma* and others, which at Pinang appear to affect a much greater elevation. Instances of Reptiles in common to the plains of Singapore and the hills of Pinang are: *Ptychozoon homalocephalum*, *Gymnodactylus pulchellus*, *Lygosoma chalcides*, *Ptilidion lineatum*, *Typhlops nigro-albus*, *Calamaria lumbricoidea*, *Var. Leptophis caudalineatus*, *Elaps intestinalis*, *Elaps nigromaculatus*.

MALAYAN PENINSULA. Geographically, not politically, from 12° N. L. between 98° and 104° E. computed to about 80,000 square miles, or about 4000 square miles less than Great Britain. Zoological information has hitherto been confined almost exclusively to the plains of the western part. The productions of the chain of mountains dividing the Peninsula, and terminating in Cape Romania in 1° 17' N. L. (Point Bûrus in 1° 15' N. L.) are almost entirely unknown. The late Mr. Griffith on a visit in the early part of 1842 to mount Ophir (*Gûnong Lédang*, in about 2° 30' N. L. on the eastern boundary of the district of Malacca, granite, and computed about 4000 ft.) made the interesting discovery, that from 1500 ft. and upwards the vegetation changes completely, and in many respects assumes a Polynesian or Australian character. Early in 1847 Lieutenant Colonel James Low visited Keddah Peak, (*Gûnong Jerai*), opposite to the town of Keddah, in about 6° 5' N. L. which he observes is not granite, but stratified, abounding in minerals. According to observation of the boiling point of water, the summit, a small platform on the edge of the strata, is 5,705½ ft. above the sea. Towards the summit the vegetation becomes very stunted and partakes of Australian character.\* Colonel Low further observes that during the ascent he did not see a single animal, but found foot prints of a Rhinoceros, smaller than usual, he supposes, up to the very summit. To a casual visiter of the Malayan hill forest, during the day, the paucity of animals is a striking feature. The noontday light subdued by the dense foliage of the towering stems, gives to the scene a sombre character, heightened by the unseen denizens. Their presence is manifested in the shrill vibrations of Cicadæ, one of which on the Pinang hills is noted for its resemblance to the cavalry trumpet, the call of the Tupai, the disual tap of the gigantic woodpecker, the creaking flight of a Buceros, or the retreat of frightened Semnotithæes.

\* A collection of plants from the summit of the mountain, with which Colonel Low favoured me, were examined by Capt. Munro, H. M. 39th Regiment, the only botanist at present in Calcutta, previously to their being despatched to the Royal Gardens, Kew.

## CHELONIA.

| SPECIES.                                    | HILLS.  | PLAINS.                                                                               |
|---------------------------------------------|---------|---------------------------------------------------------------------------------------|
| <i>Casemys spinosa</i> , Gray.              | Pinang. |                                                                                       |
| <i>Emys crassicollis</i> , Bell, MS.        |         | Ponds and rivulets Malayan Peninsula, Pinang.                                         |
| <i>Emys platynota</i> , Gray.               |         | Malayan Peninsula, Pinang.                                                            |
| <i>Emys trivittata</i> , Dum. & Bibr.       |         | Ponds and rivers Malayan Peninsula, Pinang, Bengal.                                   |
| <i>Cistudo amboinensis</i> , (Daud.)        |         | Ditto ditto.                                                                          |
| <i>Tetraonyx affinis</i> , Cantor.          |         | Sea off Pinang.                                                                       |
| <i>Gymnopus gangeticus</i> , (Cuvier.)      |         | Rivers and sea-coast Malayan Peninsula, Bengal.                                       |
| <i>Gymnopus cartilagineus</i> , (Boddaert.) |         | Ponds and rivers Malayan Peninsula, Pinang, Java, Dukhun, "India," "China."           |
| <i>Gymnopus indicus</i> , (Gray.)           |         | Rivers, estuaries and sea-coast Malayan Peninsula, Pinang, India, Philippine Islands. |
| <i>Chelonia virgata</i> , Schw.             |         | } Sea.                                                                                |
| <i>Chelonia imbricata</i> , (Lin.)          |         |                                                                                       |
| <i>Chelonia olivacea</i> , Eschscholtz.     |         |                                                                                       |

## SAURIA.

|                                                        |         |                                                                                                                        |
|--------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------|
| <i>Crocodilus vulgaris</i> , Cuv. Var. B. Dum. & Bibr. |         | Rivers, estuaries and sea-coast Malayan Peninsula and Islands. Java, Sumatra, Tenasserim, Bengal, Coromandel, Malabar. |
| <i>Crocodilus porosus</i> , Schneider.                 |         | Ditto ditto and Seychelle Islands, Timor.                                                                              |
| <i>Platydictylus tugubris</i> , Dum. & Bibr.           |         | Pinang.                                                                                                                |
| <i>Platydictylus gecko</i> , (Linné.)                  |         | Malayan Peninsula, Bengal.                                                                                             |
| <i>Platydictylus stentor</i> , Cantor.                 | Pinang. |                                                                                                                        |
| <i>Platydictylus monarchus</i> , Schlegel.             | Pinang. | Pinang, Malayan Peninsula, Singapore.                                                                                  |
| <i>Ptychozoon homalocephalum</i> , (Creveld.)          | Pinang. | Singapore.                                                                                                             |
| <i>Hemidactylus peronii</i> , Dum. & Bibr.             |         | Pinang.                                                                                                                |
| <i>Hemidactylus coctai</i> , Dum. & Bibr.              |         | Pinang, Bengal.                                                                                                        |
| <i>Hemidactylus frenatus</i> , Schlegel, MS.           | Pinang. | Pinang, Singapore, Malayan Peninsula, Bengal.                                                                          |
| <i>Hemidactylus platyurus</i> , (Schneider.)           |         | Pinang, Bengal.                                                                                                        |
| <i>Gymnodactylus pulchellus</i> , (Gray.)              | Pinang. | Singapore.                                                                                                             |

| SPECIES.                                 | HILLS.                     | PLAINS.                                 |
|------------------------------------------|----------------------------|-----------------------------------------|
| <i>Varanus nebulosus</i> , Dum. & Bibr.  | Pinang.                    | Bengal.                                 |
| <i>Varanus flavescens</i> , (Gray.)      |                            | Pinang, Bengal.                         |
| <i>Varanus salvator</i> (Laurenti.)      | Pinang.                    | Malayan Peninsula, Bengal.              |
| <i>Bronchocela cristatella</i> , (Kuhl.) | Pinang, Malayan Peninsula. | Malayan Peninsula, Singapore.           |
| <i>Lophyrus armatus</i> , (Gray.)        |                            | Pinang, Singapore.                      |
| <i>Dilophyrus grandis</i> , Gray.        | Pinang.                    |                                         |
| <i>Draco volans</i> , Linné.             | Pinang.                    | Pinang, Malayan Peninsula.              |
| <i>Draco maculatus</i> , (Gray.)         | Pinang.                    |                                         |
| <i>Leiolepis bellii</i> , (Gray.)        |                            | Pinang, Malayan Peninsula.              |
| <i>Eumeces punctatus</i> , (Lin.) Var.   | Pinang.                    | Pinang, Malayan Peninsula, Singapore.   |
| <i>Euprepis rufescens</i> , (Shaw.)      |                            |                                         |
| Var D, Dum. & Bibr.                      | } Pinang.                  | } Pinang, Malayan Peninsula, Singapore. |
| Var E, Dum. & Bibr.                      |                            |                                         |
| Var F, Dum. & Bibr.                      |                            |                                         |
| <i>Euprepis ernstii</i> , Dum. and Bibr. |                            | Pinang, Malayan Peninsula.              |
| <i>Lygosoma chalcides</i> , (Linné.)     | Pinang.                    | Singapore.                              |

## OPHIDIA.

## Innocuous.

|                                                |                            |                                                                                                                      |
|------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>Pitidion lineatum</i> , (Boie)              | Pinang.                    | Singapore.                                                                                                           |
| <i>Typhlops nigro-albus</i> , Dum. & Bibr.     | Pinang.                    | Singapore.                                                                                                           |
| <i>Typhlops braminus</i> , (Dandin.)           | Pinang, Malayan Peninsula. | Pinang, Singapore, Malayan Peninsula, Bengal, Assam.                                                                 |
| <i>Cyrtodrophis rufus</i> , (Laurenti.)        |                            | Singapore, Tranquebar, Bengal.                                                                                       |
| <i>Xenopeltis unicolor</i> , Reinwardt.        | Pinang.                    | Singapore, Malayan Peninsula.                                                                                        |
| <i>Python reticulatus</i> , (Schneider.)       | Pinang, Malayan Peninsula. | Pinang, Singapore, Malayan Peninsula, Bengal?                                                                        |
| <i>Acrochordus javanicus</i> , Hornstedt.      | Pinang.                    | Singapore, Java.                                                                                                     |
| <i>Acrochordus granulatus</i> , (Schneider.)   |                            | Rivers and Sea-coast of Malayan Peninsula and Islands, New-Guinea, Timor, Java, Sumatra, Coromandel, Bay of Manilla. |
| <i>Calamaria lumbricoidea</i> , Schlegel, Var. | Pinang.                    | Singapore.                                                                                                           |
| <i>Calamaria linnei</i> , Boie, Var, Schlegel. | Pinang.                    | Java.                                                                                                                |
| <i>Calamaria longiceps</i> , Cantor.           | Pinang.                    |                                                                                                                      |
| <i>Calamaria sagittaria</i> , Cantor.          |                            | Malayan Peninsula, Bengal.                                                                                           |
| <i>Coronella baliodeira</i> , Schlegel.        | Pinang.                    |                                                                                                                      |



| SPECIES.                                       | HILLS.                         | PLAINS.                                                                                               |
|------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------|
| <i>Xenodon purpurascens</i> , Schlegel.        | Pinang.                        | Java.                                                                                                 |
| <i>Lycodon auleus</i> , (Linné.)               | Pinang.                        | Pinang, Malayan Peninsula, Bengal.                                                                    |
| Var. A,                                        | Pinang.                        | Pinang, Bengal.                                                                                       |
| Var. B,                                        | Pinang.                        | Pinang, Malayan Peninsula.                                                                            |
| Var. C,                                        | Pinang, Malayan Peninsula.     | Pinang, Malayan Peninsula.                                                                            |
| Var. D,                                        |                                | Malayan Peninsula, Bengal.                                                                            |
| <i>Lycodon platurinus</i> , (Shaw.)            | Pinang.                        | Bengal?                                                                                               |
| <i>Lycodon effraenis</i> , Cantor.             | Pinang.                        |                                                                                                       |
| <i>Coluber fasciolatus</i> , Shaw.             |                                | Malayan Peninsula, Coromandel.                                                                        |
| <i>Coluber radiatus</i> , Schlegel.            |                                | Pinang, Singapore, Malayan Peninsula.                                                                 |
| <i>Coluber korros</i> , Reinwardt.             |                                | Pinang, Singapore, Malayan Peninsula.                                                                 |
| <i>Coluber hexagonotus</i> , Cantor.           | Pinang.                        |                                                                                                       |
| <i>Dipsas dendrophila</i> , Reinwardt.         | Pinang, Malayan Peninsula.     | Pinang, Singapore, Malayan Peninsula, Java.                                                           |
| <i>Dipsas multimaculata</i> , Schlegel.        | Pinang.                        | Malayan Peninsula.                                                                                    |
| <i>Dipsas cynodon</i> , Cuvier.                | Pinang.                        | Malayan Peninsula.                                                                                    |
| <i>Dipsas boa</i> , Boie.                      | Pinang.                        | Java.                                                                                                 |
| <i>Herpetodryas oxycephalus</i> , (Reinwardt.) | Pinang.                        |                                                                                                       |
| <i>Dryinus prasinus</i> , (Reinwardt.)         | Malayan Peninsula and Islands. | Malayan Peninsula and Islands.                                                                        |
| Var. A,                                        | Ditto.                         | Ditto.                                                                                                |
| Var. B,                                        | Pinang.                        |                                                                                                       |
| Var. C,                                        | Pinang.                        |                                                                                                       |
| <i>Leptophis pictus</i> , (Gmelin.)            | Malayan Peninsula and Islands. | Malayan Peninsula and Islands, Bengal.                                                                |
| Var. A,                                        | Ditto.                         | Ditto.                                                                                                |
| <i>Leptophis caudatineatus</i> , Cantor.       | Pinang.                        | Singapore.                                                                                            |
| <i>Leptophis ornatus</i> , (Shaw.) Var.        | Pinang.                        | Malayan Peninsula.                                                                                    |
| <i>Tropidonotus umbratus</i> , (Daud.) Var.    |                                | Malayan Peninsula and Islands, Java, Bengal.                                                          |
| <i>Tropidonotus stutatus</i> , (Linné.)        |                                | Pinang, Malayan Peninsula, Bengal, Nepal, Coromandel, Bombay.                                         |
| <i>Tropidonotus schistosus</i> , (Dau.) Var.   |                                | Malayan Peninsula, Bengal. Ditto ditto.                                                               |
| <i>Tropidonotus cerasogaster</i> , (Cantor.)   |                                | Malayan Peninsula, Bengal.                                                                            |
| <i>Tropidonotus junceus</i> , Cantor.          | Pinang.                        |                                                                                                       |
| <i>Homalopsis</i> .                            |                                | All the Malayan species inhabit fresh-water, rivers, estuaries or the sea-coast, as noted under each. |

## VENOMOUS.

| SPECIES.                                             | HILLS.                                  | PLAINS.                                                          |
|------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------|
| <i>Elops melanurus</i> , (Shaw.)                     |                                         | Malayan Peninsula, Tenasserim, Nerva.                            |
| <i>Elaps intestinalis</i> , (Laurenti.)<br>Var.      | Pinang.                                 | Singapore, Malayan Peninsula, Sp. Java, Malwah, (Central India.) |
| <i>Elaps nigromaculatus</i> , Cantor.                | Pinang.                                 | Singapore.                                                       |
| <i>Elops bivirgatus</i> , Kuhl. Ver.                 | Pinang.                                 | Malayan Peninsula.                                               |
| <i>Bungarus flaviceps</i> , J. Reinwardt.            | Pinang.                                 |                                                                  |
| <i>Bungarus candidus</i> , (Linné.)                  |                                         | Malayan Peninsula, Bengal, Coromandel, Malabar.                  |
| <i>Bungarus fasciatus</i> , (Schneider.)             |                                         | Pinang, Malayan Peninsula, Bengal, Coromandel.                   |
| <i>Hamadryas ophiophagus</i> , Cantor.               | Pinang.                                 | Singapore, Malayan Peninsula, Bengal.                            |
| <i>Naja lutescens</i> , Laurenti. Var.<br>D. (Daud.) | Pinang, Malayan Peninsula.              | Pinang, Singapore, Malayan Peninsula, Bengal, Coromandel.        |
| Var. <i>nigra</i> .                                  | Pinang.                                 | Pinang, Singapore.                                               |
| <i>Trigonocephalus gramineus</i> , (Shaw.)           | Pinang, Malayan Peninsula, Chirra Punji | Pinang, Singapore, Malayan Peninsula, Bengal, Nipal.             |
| Var.                                                 | Pinang, Malayan Peninsula.              | Pinang, Singapore, Malayan Peninsula.                            |
| <i>Trigonocephalus sumatranus</i> , (Raffles.) Var.  |                                         | Pinang, Singapore, Malayan Peninsula. Sp. Sumatra.               |
| <i>Trigonocephalus puniceus</i> , Reinwardt.         |                                         | Pinang, Singapore, Malayan Peninsula.                            |
| <i>Iaticauda Hydrus</i> .                            |                                         | All species inhabit the sea or estuaries.                        |

## BATRACHIA.

|                                                  |                                |                                         |
|--------------------------------------------------|--------------------------------|-----------------------------------------|
| <i>Ichthyophis glutinosus</i> , (Linné.)<br>Var? |                                | Singapore.                              |
| <i>Rana leschenaulti</i> , Dum. and Bibr.        |                                | Malayan Peninsula, Bengal, Pondicherry. |
| <i>Rana tigrina</i> , Daudin.                    | Malayan Peninsula & Islands.   | Malayan Peninsula and Islands, Bengal.  |
| <i>Megalophrys montana</i> , Wagler, Var.        | Pinang, Sp. Java.              |                                         |
| <i>Amanodytes erythræus</i> , (Schlegel.)        |                                | Malayan Peninsula.                      |
| <i>Polypedates leucomystax</i> , (Grayenhorst.)  | Pinang, Malayan Peninsula.     | Singapore, Malayan Peninsula, Bengal.   |
| <i>Rana melanostictus</i> , Schneider            | Malayan Peninsula and Islands. | Malayan Peninsula and Islands, Bengal.  |
| <i>Hylodactylus bivittatus</i> , Cantor.         |                                | Malayan Peninsula.                      |

*Memorandum regarding the recently discovered ruins of Ranode, in Scindeah's Dominions ; by HENRY COPE, Secretary Archæological Society of Dehli.\**

The Right Honorable the Governor General having most liberally sanctioned, by a late order, the appointment of Lieut. F. Maisey, of the 67th Regt. N. I., to investigate the ruins of Ranode, in compliance with the suggestion of the Archæological Society of Dehli, it may be considered desirable to publish the principal inscription on those ruins, with the view of eliciting information contemporary with the researches of Lieut. Maisey ; and I have the honor to submit a brief account of the place, drawn up from the Memoranda supplied to the Society by Capt. R. R. Ellis of Shansce, when the inscription was originally forwarded by him.

Ranode is situate in the Chandoree district of Scindecah's dominions, about 35 miles nearly due South of the famous fort of Nurwur, and at no great distance (apparently 6 or 7 miles) east of the high road from Agra to Bombay. Although marked in the maps, as a place of some consequence, it is not mentioned in Hamilton's Gazetteer, and I find no account of it elsewhere. It is close on the banks of the Airawati, a small stream which takes its rise at Indore (not the capital of Holkar's dominions) three kos from Ranode, and where there is a stone image of Bhīm Sen, one of the Pandu princes, and also the remains of ancient buildings.

The edifice in which the inscription, forwarded to the Society by Capt. Ellis, was found, was first brought to light by Capt. A. Dewar, commanding the 1st Calvary of Scindeah's contingent, and is known in the neighbourhood as the "Kokai Mahal." It is built of gigantic masses of hard freestone, without any ornamental sculpture, beautifully fitted together without a particle of cement.

From the rough sketches drawn apparently by a native, and which accompanied the inscription, it is clear that this edifice is one of considerable extent ; the inscription is cut on an erect tablet, situate at the end of one of the varandahs of the Palace.

\* Communicated with the inscription and translation, by the Archæological Society of Dehli.—Eds.

There are besides this, the principal building, two tanks of considerable dimensions, named the Gass and Bhowkebaoli. There are also in the neighbourhood some Musalman tombs with inscriptions of the reign of Aurungzeb.

About eight kos further down the Airawati stream, is Kandalpur, said to be the Kandalpur mentioned in Wilkins' translation of the Bhagavat, from which Krishna carried off Rukhmini, the betrothed wife of his cousin Sisupal, the Rajah of Chanderi.

From the mere glimpse which this imperfect sketch affords of the ruins in question, we perceive that the field of investigation is ample, not only at Ranode itself, but in the neighbourhood, and we may reasonably expect very important results from Mr. Maisey's researches.

The translation which accompanied the inscription is prepared by H. M. Elliot, Esq., C. S., Secretary to the Government of India. I am assured by that distinguished Orientalist that not a name that occurs in the document is to be found in any of the genealogies hitherto published. We may further hope that several of the letters and words now omitted as undecypherable, may be restorable on such a careful investigation as Lieut. Maisey will be able to carry on.

#### INSCRIPTION.

ॐ नमः शिवाय ॥ प्राद्येष्टे नवाम्भोदगर्जितोर्जित्यजन्तिवः । वैनाय  
कानि निघ्नन्तु निर्विघ्नं नर्त्तितान्यघम् ॥ प्रसन्नोजस्विनी व्यक्ताव्यक्तरूपा  
भयंकरादेवताबाक्सरिद्धेदरक्षतादः सरस्वती । संपूर्णाङ्गमशेषकल्म  
षमुघः सम्पन्नमप्यादरादूरं पादतलावघट्टननमत् कैलासनश्यत्स्थितिः ।  
सानन्दं युगपत्सुरासुरसभासंरम्भदत्तव्यथं शम्भोर्लास्यपरिग्रहस्य दिश  
तुश्रेयांसि बः स्थानकम् ॥ चरणभरावनता वनिविनमत्कमठोरु कन्ध  
राखणोदनाद्यस्य धूर्जटेधुरिबर्ण परिष्पन्दकाकलीर्जयति ॥ उत्क्षिप्तोद्गुह्य  
पादाम्बुज गणततिभिः सार्द्धमुन्नम्य भूयः प्रायाद्यावत्स्सीमामपरप  
दभरभट्टपृष्ठान्तभूमिः ॥ इत्थं देः स्तेपिरङ्गे गगनतलचलच्चारिका  
चारुत्तैस्त्रायन्तां वस्त्रिसन्धं त्रिपुरविजयिनस्ताण्डवक्रोडितानि । भक्त्यो  
पसन्नस्थिरभक्ति काम्यपद्मासनं दारुवनेतिरम्ये विधाययज्ञं विधिनावि  
धिज्ञः किलानुजग्राहपुरापुरारिः ॥ यच्छङ्गलं विपुलनिर्वृति वीजमु  
च्चैः पूर्वोत्तरं विपुलवर्द्धितभूरिशाखः । तस्मादपूर्वउदभून्मुनि बंशय  
निर्येथिरत्नरतिसारतरः सुरतः । तस्मिन्मुनिः सकललोकनमस्यमूर्तिरि

न्दूपमःप्रतिदिनं समुदीयमानः । श्रीमानभूद्भुविकदम्बगुहानिवासीतस्मा  
 चशारमठिकाधिपतिर्मुनीन्द्रः । तैरब्धिपालः प्रमथाधिप्रस्यतुलां दधत्का  
 मजयोदयेन । ततोभवद्भूरितपास्ततोपि सुख्यातिरामर्दकतीर्थनाथः ॥ त  
 स्मात्पुण्ड्ररगुरुगुरुवद्भूरिगुणः प्रज्ञातिरेक जनितस्यवभूवभूमिः । यस्या  
 धुनापिविवुधैरिति कृत्यशंसित्याह्वयतेनबचनं नयमार्गविद्धिः ॥ धन्य  
 कोपिचकास्यचिन्त्यमहिमातुल्योमुनिर्भास्वता राजानुत्तमशब्दपूर्वशिख  
 राभ्यर्णप्रकीर्णद्युतिः ॥ दीक्षार्थीतिवचोनिश्चयसुहृतीचारोक्तमूर्वीपति  
 र्यस्येहानयनाययत्नमकरोच्चीमानवन्तिपुरा ॥ गत्वा तपस्यन्तमुपेन्दुपू  
 र्वेपुरेतदाश्रीमदवन्तिवर्मा ॥ भृशंसमाराध्यतमात्मभूमिकथंचिदानीयच  
 कारपूताम् । अथोपसद्याथ चसत्वरारो दीक्षां सदक्षोगुरुदक्षिणार्थम् ॥  
 निवेद्ययस्मैनिजराज्यसारं स्वजन्मसाफल्यमवापभूपः । सकारयामासस  
 मृद्धिभाजं सुनिर्ममः सन्मुनिरत्नभूमिम् ॥ प्रसिद्धमावारिधिमेरुकल्पम्  
 श्रीमत्पुणेमत्तमयूरनाम्नि पुनर्द्धितीयं स्वयमद्वितीयोगुणैर्मुनीन्द्रोरणिभद्र  
 संज्ञकम् ॥ तपोवनश्रेष्ठतमं विधायप्रेष्ठःप्रतिष्ठां परमांनिनाय । आसीद  
 तःकवचपूर्वशिवाभिधानोलोकप्रियः कवचवद्दृढदृष्टशक्तिः ॥ यःसर्वतोव  
 ह्रतिसंयतिसंयताश्चोदाङ्गुणाच्छामितिकामशरैरभेदः ॥ सदाशिवस्तस्य  
 चशिष्यआसीत्सदाशिवः सर्वजनस्यशास्ता । तत्पावनं योरणिप्रदनामाप्र  
 साधयामासतपःसमृद्ध्या ॥ अस्मादनल्पादुदयादिकल्पालब्धोदयोस्तब्ध  
 दयेष्टसंज्ञः । आचार्यसूर्यस्तमसांविदार्यप्रकाम मौदार्यमहार्यवीर्यः ॥  
 निरवधिबर्धतेनचविभर्त्तिपुरोलघुभावमात्मनः । प्रसरतिदिङ्मुखेधुनच  
 लति मनागपिमार्गसंस्थितेः ॥ स्फुरतिसमस्तवर्णरचितंनचमुञ्चतिचारु  
 शुभ्रतामलमधुनापियस्य कृतिनोद्भुतमित्यमहर्निशंयशः ॥ यस्यात्मेन्द्रिय  
 निग्रहेनिजगुरुस्थानान्यलंकुर्वतः । प्रीतिं पात्रपरियहेचदधतःसाधूपभो  
 गयाःश्रियः ॥ स्वभ्यस्ताखिलशास्त्रनिर्मलमतेरासीत्पुपाकः परंकीर्त्तैःसोद  
 रपूर्तिमात्ररतिभिसृष्टाभिभूतैःकथा ॥ यदिगुणकीर्त्तनमधुनानिःशेषं त  
 स्यसाधुविवरणमि । तद्वक्तुकीर्त्तिमिमांनावसरः प्रस्तुतात्तदलम् ॥ आचा  
 र्याद्गुरुभाववर्धितगुणानिर्व्यूढवीर्यादयःशिष्यःशिष्यवतां विशेषकश्चप्र  
 स्तावमुख्यःस्यताम् ॥ श्रीमान्ग्योमशिवाङ्गयःसमभवत्तस्यापितादृक्पुनः  
 र्याद्गुरुभूरिभिरित्य मद्भुततमैस्तमैस्तपोभिर्भवेत् ॥ स्नाध्यजन्मजगत्रयेपिद  
 धतःशेषस्यतस्यक्षमामस्यथामपदादि मन्त्ररचनाख्याताभिधानस्यच ॥ उ  
 ळ्लंघ्यविपदिप्रजां गुरुभरव्यापारदत्तात्मनोयस्योदत्त परोपकारकरुणा  
 मात्रं प्रवृत्तेःफलम् ॥ यस्योच्चैश्चरितंचिरात्पुलकभद्रगुणस्यलश्रीणिभिर्भ



भ्रूयञ्जितमन्त्रतारगमकैः संगीयते किन्नरैः । यावच्चन्द्रमसा समं प्रतपतः प्रध्व  
 स्यदूरं तमस्तस्यास्याद्भुतकर्मणः किमपरैस्तोत्रैर्विचित्रैरपि ॥ द्राघिष्ठसद  
 नुष्ठानोन्मदिष्टमितभाषितः ॥ योन्वतिष्ठत्प्रतिष्ठावत्प्रेष्ठः सद्भूतिनां व्रतम्  
 यः संयमस्य नियमस्य नयस्य सम्यक्पुण्यस्य चारुचरितस्य च कीर्त्तनस्य । एकत्र  
 वस्तुमिति सद्गुणसंयुतस्य त्वष्टा प्रतिश्रयगृहं गृहिणे वज्रं ॥ सर्वत्र निर्द  
 तिकलैकनिरंतरेण लब्धोदयेन च वलेन दिगायतेन । वद्विष्णुनाभिक्रम  
 लंकृतमेतदिन्दोद्यास्तेन यस्य च गुणप्रसरेण विश्वम् । लोकालोकान्तरालभ  
 मणपरिणतावर्णेन वा प्रवृत्तिर्वातूलोत्ताललीलाद्भुतगति तुल्यगव्याप्तदिक् च  
 क्रवालः । निर्झूयाशेषविश्वाक्रमणपदरजः पावनैर्वर्त्तते दमयादाश्च न्यूनान्  
 स्तपसउदगमयस्यदूरप्रतापः ॥ येनेदं पुरमापदत्रतमसेमन्नियोगाद्विशः  
 सत्कीर्त्यारणिपद्मसूक्ष्म चिरादुद्धृत्य यत्वाश्रमम् भूषणं शशिनेव निर्मलत  
 रस्फारस्फुरत्तेजसा सर्वानभ्युदयेन पौरसहितं नीतं पुनस्ताश्रियः ॥ स्फारै  
 र्वाथ हिरण्यरत्ननिर्वहैर्निःशेषमन्तर्वहस्तुङ्गत्तुङ्गतरङ्गमैर्मदभरोद्धृतै  
 श्च गर्जद्गजैः ॥ स्वस्थानस्य विशेषं विद्रुतमस्योदामलक्ष्मीभृताभूभागास्त  
 पसापुनर्न बरुचः संजज्ञिरे यस्य च ॥ साक्षाध्यावसतिः स एव विषयस्ते प्रा  
 णिनस्तादिशः सद्भूभूमिपतिः स एव किमतस्तेते प्रदेशाः परं ॥ यन्तास्ते यम  
 शेषसत्त्वहितकृत्स्नत्त्वप्रवृत्तः स्वयम् पुण्यानां प्रगुणीतुतौ वनिहजापुत्रो वयु  
 आनिव ॥ यदाचामनसां च गेचरमतिज्ज्ञानेन भूम्नान्नितम् यद्भूतं गुणगर्वि  
 के दिविषदां दानेरदभ्यादरम् ॥ यः सत्त्वोऽञ्जलितैः प्रचण्डतपसां तेजोभि  
 रुन्मीलितं । तन्मन्यत्र चरित्रमुन्नतमनाधत्ते धुनावस्थितम् ॥ पुरायोषित्सङ्गा  
 दनिभृतनिजाक्षं भगवता विजिग्ये यः कामस्त्रिपुररिपुरणा विस्तृत  
 षा ॥ निरुद्धाक्षः क्षान्त्यातमयमजयत्सङ्गरहितः सुचीर्णानां स्याद्वा किमि  
 ह तपसां दुष्करमिति ॥ स्फारास्फालनघातनिर्दयदङ्गदुग्भीरभेरीरवव्या  
 जेनोज्ज्वराकुमारचरितात्सद्गुणार्थतपः ॥ यस्याग्नेन यतस्त्रिसन्धमधुत  
 ध्यानस्थिते धूर्जटि मूचैतन्यो जितवत्तयापि समये सद्भूपवेलोत्सवास्तु  
 त्यं स्यात्किमिहास्यनाम चरितत्रयन्तपुण्यार्थिनामावाल्यात्सहकीर्त्तिस  
 म्मिततपस्तेजः समुत्तेजितम् ॥ यस्योच्चैरलधून्नमद्गुणगुरुरक्षाण्डसाडम्ब  
 रव्येग्रैर्द्राकृत रुद्रवाहपरिधैः संवार्यते यत्नतः सिद्धान्तेषु महेश्वर्य नि  
 यतन्यायेक्षपादो मुनिर्गम्भीरे च कणाशिनस्तुक्लभुक्शास्त्रे स्वयं जैमिनिः ॥  
 साङ्ख्येन त्वमतिः स्वयंचक्रपिलो लोकायते सद्गुरुबुद्धो बुद्धमते जिने क्षि  
 षुजिनः को वायनायं कृती ॥ यद्भूतं यदनागतं यदधुना किञ्चित्किञ्चिद्वर्त्तते  
 सम्यग्दर्शनं संपदातदखिलं पश्यन् प्रमेयं महत् ॥ सर्वज्ञः स्फुटनाभि

मेषकोपिभवानन्यः क्षिती शक्रेधर्त्ते किन्तु न शान्तधीर्वियमदृ योत्र  
वपुः केवलम् । यस्मिन्तुद्दामधाग्नि प्रचुरतरतपः सोमिविख्यातनाम्नि  
सर्वानन्द्युक्तसोमिचित्ति भट्टरुभग स्पर्द्धिषु व्यद्वरिग्नि । सम्प्रवेग्नि  
सत्सुखयश्निहितस्फार सारप्रयिम्निविद्योत्सर्पन्महिम्निचिभुवनतिलके  
कैगुणाहन्तनस्युः ॥ सलीनंमुखएवशाक्य करिणामत्यूर्जितं गर्जितंत्रासाद्य-  
स्यगजेन जम्बुक शतेदुर्व्याहृतंसंहृतं ॥ सोढुजातुनजैमिनोयहरिणैर्लीलां-  
कृतं ऊंकृतं तस्यान्यद्गगने सकाननपतेः किंस्पास्तु तं प्रस्तुतम् ॥ यस्याच्चकै  
स्फुरति सं तमसंनिरस्य तेजः परंप्रति निशंप्रतिवासरंच ॥ अन्यःसए-  
घननुचन्द्रमसोरवेश्चचन्द्रावदातचरितः सुतरां चकास्ति ॥ यस्यामलं-  
स्फुरति सद्गुणरत्नवन्दमानन्दकारिजगतां जडताविह्वनं । श्रीयोम-  
शम्भुजलधिः सखलुह्यदस्तल्लसतां समभवद्भुविकोप्यपूर्वः । माधुर्य-  
विनयोनयोनलसतात्यागक्षमा प्रअयःस्यैर्यं धैर्यमहार्यंवीर्यकलितंसद-  
ब्रह्मचर्यतपः । इत्यादिप्रचिनोमिचेतसिचिरंयद्यत्किमप्यादरात्तत्सर्वस-  
मचिंत्यमस्यमहतः कस्यास्तुधत्तांपथि ॥ रेजुःसज्जनरक्तभाव जननान्या-  
सिन्धुवेलावधेश्चित्रंयस्ययशांसि कुन्दकलिकाकोर प्रभाभांज्यपि ॥ तस्यायं  
खलुदेवतायतनवान्वापीनिवेशस्यशुभः सोद्यानः प्रथतेस्वकीर्त्तिविभवः सा-  
क्षादिवानश्वरः । शिवयुग्ममुमादेवी नाद्येश्वरविनायकौ ॥ समञ्चमन्दि-  
रैरमै । रयमेतान्यचीकरत् ॥ प्रतिक्षपंयाप्रतिविम्बतांगते सुनिर्मलेवारिणि-  
तारकागणे ॥ कुमुदती सङ्गसमुर्जिताप्यलंविभाति विश्वकुमुदैरिवाचिता  
प्रसादमाधुर्यनिकामभट्टयविराजतेयत्रगभीरमम्भःविडम्बयत्सत्कविकाव्य  
वर्गंविमुद्ववर्णाहितचारुशोभम् । शैलात्मजाभक्तिपरप्रयातयासुराङ्गना  
नूपुरसिञ्जितेन । प्रतिक्षणंवाकलहंसनादंभ्रमम्बिधत्तेश्रुतिपेक्षलेन । कृतोद-  
धानावनिताजनानां मुखैर्विचित्रापरपात्ररम्यैः तोयंगतैर्याप्रतिविम्बतेनमु-  
खारविन्देचविभर्त्तिशोभाम् अपूर्वविन्यासविशेषकेणविभूयितायादयि-  
तेवदृष्टा । सोपानमालावलिचारुमध्यानानन्दयत्कस्यमनोमनोज्ञा ॥ प्रासा-  
दयत्र भासन्तेकुन्देन्दुकुमुदोज्ज्वलाः ॥ श्रीयोमेशमहीपालयशेवीजाङ्गरा-  
इव ॥ यानीलकण्ठेनतपोपकण्ठभूतास्पदाधामपरसुखस्य । प्रासादरम्यार-  
मणीयभूमिः पुरापुरारेःसदृशीचकास्ति ॥ यत्सन्निधौसान्द्रसुवासिताम्भाः  
प्रासादमालानुदिनं विभाति । भयेनभानोःपरिणाममेवज्योत्स्नास्थितेवा-  
मरसद्गमूर्त्त्या । अम्भोनिधित्तुङ्गतुषारशैलेसम्यग्विराजेद्यदिकूललीनेतेनो-  
पमीयेततदास्फुटंयासमुन्नतेर्नाकि गृहेविभान्ति ॥ अमुक्तमुक्ताफलचा-  
रुकान्तितोयंसदैवप्रतिभातियत्र । अमूर्त्तताराद्यमसोढुकाममुच्चैरभृन्न

मिवान्तरिक्षम् ॥ शरन्निषेकामलचन्द्रकान्त्यासरोजलक्ष्म्येवसरोजल-  
 द्विः । अलङ्कृताचारुतयाव्यधत्तयानिर्दृष्टिकस्य न दृश्यमाना ॥ यासर्वदा  
 नाञ्जलितयन्त्रिकामंसत्सूपकारचंगभीरतांच । जलैरनल्पैर्भृशमास्थिता  
 पिपलं तदेतद्विकुलीनतायाः ॥ मृगाङ्गविम्बेप्रतिमांगतायाःस्फुरत्तरङ्गा  
 ङ्गुलिभिर्विलोलैः । सुचारुसौन्दर्यविलोकनायधृतामलादर्शतलेवभाति ॥  
 स्थिराणिशुद्धानिरुचोज्ज्वलानि निरन्तराण्यार्जवसुन्दराणि सतामनांसी  
 वसदानुकूलविभान्तियस्याः सुरमन्दिराणिइदन्नभःकिन्ध्रवताकुलोस्य  
 किम्बामृततत्कथ मेतदत्र ॥ अहोइदंकिन्वितितर्कयुक्ताजलं न निश्चेतु  
 मलंजनोघः । सन्मानभूमिर्भवतुप्रकामंमनोरमोद्यौर्वज्जवारिदाच । त  
 थापिसासाम्यगुणादुदस्ताययाविचित्रारचनांदधत्वा ॥ जितारिषड्वर्ग  
 मनर्थमूलंधर्मेरताः सन्तुसदैवसन्तः ॥ यस्यामितीवाहसुरालयालीनपर्णा  
 यतमन्दनाथ ॥ रङ्गत्तरङ्गातिमनोरमदूरथाङ्गमम्भोरुपयोधरायाः । दि  
 क्षुक्षिपन्तीशफरीकटाक्षानचूचुरत्पान्थदशःप्रियेव ॥ यदस्तिकिञ्चित्कचि  
 दप्यकिञ्चिदानन्दहेतुर्जगतीनचस्ता । तदेकदेशेनिखिलंविधाययावेधसो  
 चैर्घटितेवरम्या । कुवलयवतीववापी विभूषयतियदतिसुप्रसिद्धमदः ।  
 चित्रमिदंतुविनिधाय कुवलयमप्यलंकुरुते ॥ स्थिरायैषावापीगगन शि  
 खरालिर्भगवतोद्भुताश्चर्योद्युक्तामधिकतपसोभूरियशसः । यदीयाभाती  
 यं शरदमलचन्द्रांशुधवलासुराणां सद्मालीविवकटतटदृष्टेशिखरिणी ॥  
 वापीतडागनिकटेयःपादपरोपयिष्यतिधन्यःशतशपञ्चपातकयुक्तः खलुदु  
 स्तरेनिरये पञ्चैवतेषामिहपातकानिश्शस्यन्तिवध्वाभृशम् ॥ मयैतेरत्यभ्य  
 न्तरेमूढधियोरजन्यांदास्यन्त्यनार्यावसतिश्चनार्याः । प्रशस्तादेवसंलापपूर्व  
 जत्ताङ्गयेन यान्विताम् शब्दाथासामुदसुदत्तमिटदमरादेचदलमुतनघा  
 रङ्गदलेन वर्णितीषपी स्तिकारम्याजेज्जाकनोदग्धोदिवानङ्गेणालिखिता ।

*Translation of an Inscription at Ranode.*

Praise be to Shiva who dwelleth in a land where rains perpetually fall, and who is the lord of Paradise, and giver of happiness to mankind \* \* \*, a god most righteous and powerful. \* \* \* Praise be to him to whom sacrifices for propitiation of sins are offered, who keepeth his word, and who dwelleth in Kailas and on whom all Devatas and Asurs attend.

May the injunctions of the conquerer of Tirpora be always your guide.

Padmasan, with implicit faith celebrated a Jag in the delightful forest called Daruban, by means of which he gained the favour of Shiva, who

is pleased only by placing great confidence in him. \* \* \* He prospered by virtue of this holy performance; he attained great power, and his family increased greatly. He was succeeded by a still better person of Muni descent. His name was Surendr; he had a pure heart and possessed great power, and commanded universal respect. His dominions increased daily like the new moon. His son was the most celebrated Kadamhiguhambusi, whose son was Rajá Shankhmathikadhipat, whose son was Ambipal. This prince like Mahadev, was a great conqueror of his enemies. From him descended Bhoritapa; his son was Tirath Nath, and from him descended Rain, a prince of great renown. His son was Purandargur, who was as powerful as his father, and who possessed a great inventive genius, and is admired to this day by all learned men for his extensive knowledge and superior talents. He was so shrewd that no lawyer could cheat him of his wealth. His son was Rajanishikhrabharan, the most venerable and praiseworthy man of the time, whose fame shone with equal lustre with the sun. The virtuous and wealthy Rajá Avanti, having heard from his messenger of the unparalleled qualifications of this worthy person, wished to see him before performing the Jag, he was now going to celebrate. Rajá Avanti, the Chattri, went in person to that pious man, and after using every art and entreaty, brought him to Opendrpore, which abounds with Tamal-trees. \* \* \* The wise and well educated Monarch gave charge of his kingdom to him and himself retired to do penance. This most virtuous and pious prince who was as famous as the Sumeru Mountain, and who was the cleverest man of his age, entrusted the management of the government of Mattinagar to Rani Paindr and having retired to a solitary place, passed the remaining days of his life in performing worship. He was venerated by all. To him succeeded Cavach Shiva, who was beloved by all his subjects, and was as strong as armour. He was bold in field, had skill enough to ward off successfully the weapons of his enemy, and had subdued his passions. He was succeeded by his disciple Sada Shiva, a man of great forbearance; when he himself like his predecessor sought retirement. Sada Shiva's son was Sudhdaesh a prince of equal dignity, resembling to mountain Odayáchal. He was so powerful that he destroyed all his enemies, as the beams of the sun remove darkness. He was as generous as powerful. His dominions increased to an astonishing extent. He had not



\* \* \* \* \* His power extended to the remotest parts of the world, he never deviated from the prescribed rules. The fame of that good Monarch shines to this day like the moon. He had control over his passions and thus became an ornament to the seat of his Guru. He preserved peace throughout his reign and kept alliance with those who were worthy of his confidence. His \* \* \* was \* \* \* a man very wise and learned. This prince deserves great commendation, but suffice it to say that he humbled the pride of all his enemies. His excellencies are too numerous to be described in this short sketch. He was succeeded by his disciple Biyom Shiva, a most worthy and able person, and as pious as his predecessor. He acquired universal fame. He was highly forbearing and he was called Biyom Shiva, because he composed many verses in praise of Biyompad (or Vishnu). He gave much protection to his subjects and devoted himself always to the cause of others. His character was so commendable that it was sung by Kumers (celestial choristers.) The fame of that great Monarch spread over the earth like the moon-light. \* \* \* What more should I say in praise of this extraordinary man than \* \* \* He was most pious, and much devoted to worship; he was gentle in his speech and he followed the way of righteousness. He had a perfect command over his passions. He was very punctual in the discharge of his duties. He was a good administrator as well as a virtuous man. His words were very instructive, and all the good qualities were combined in him. \* \* \* Jag \* \* \* He possessed a very large kingdom which increased every day. \* \* \* He was the most excellent person of his time. All his acts were surprising. His dominions extended to all parts of the earth. He had travelled over the whole world and had gained universal applause. He repopulated the long desolated city of Mutmayurpur and made it as flourishing as in the days of Ranipaindr. \* \* \* This city was now re-peopled by him and made the seat of his government. He embellished the city with gold and pearls; his beautiful horses \* \* \* and stately elephants. He caused the buildings in the city to be cleaned. This great king with his immense wealth restored that admirable city to its ancient splendour. He superintended himself the construction of the new buildings \* \* \* His pious and glorious actions were admired both by men and gods \* \* \* who had turned away his eye from anger which is contemned by all good men. He was a man

of great forbearance and piety and there is nothing too good to be obtained by those who are always devoted to worship. \* \* \* were so fat that a slap on their haunches produced a sound as loud as that of a trumpet. They were as swift in their motion as the sun. The Rajá was very punctual in the performance of the worship required of a Brunnhehari. \* \* \* He had acquired a good name by his generosity and pious conduct. He was a prince of highest repute. He was as beautiful as Indra. The arms of Shiva were his protectors. Mahadev was never so much pleased with any person as with him. He never spoke trifles even when he conversed with his friends. He was of a fair complexion; and was the greatest man of his age. He had a thorough acquaintance with the doctrines of the Buddhist religion, and knew those of the religion of Jains as well as they themselves did. He had knowledge of the past, present, and the future. \* \* \* His outward appearance was such as excited terror, and that famous and pious Rajá (was so bold) that he feared no enemy. He was kind to those who were good; he knew each person's worth, and he deserves great praise for his virtues. He was the mightiest Monarch of his time, and possessed all the qualities of a good man, \* \* \* before the noise of elephants \* \* \* like the deer and jackals \* \* \* could stand or endure \* \* \* His talents shone with equal splendour in day and night, and his renown spread over the world like the moon-light. That excellent prince was adorned with a garland of all virtues that a man can possess. \* \* \* There never was a man superior to him in any respect in this world. He was very submissive, just, energetic, mild, wise, brave and pious. \* \* \* He had gained popular applause. Many Baolis, magnificent buildings, gardens \* \* \* temples in honor of Shiva, Parvati, Nandishor and Ganesh were constructed by him. The water of the Baolis was so pure that the shadow which the stars reflected in it seemed every night like Kumud flowers, and the ornaments which adorned the feet of those women who came to bathe there made a noise like that of a swarm of geese. The image of women that looked into the water was seen in it as clear as a lotus flower. The Baolis were adorned like a beautiful woman with every kind of embellishment, and every person that looked at their steps was highly pleased. They were the monuments of this Rajá's greatness \* \* \* \* In that pleasant land, and in those splendid buildings the Rajá lived like Mahadev. The



lofty buildings which surrounded those Baolis prevented the sun's rays from reaching the surface of water in them, and it appeared as if the sun was ashamed to show its face to that pure water. They were so magnificent that you would suppose them to be the dwelling of gods. They were as cool as celestial habitations which are refrigerated by the gentle breeze of the sea. \* \* \* The buildings which were on the banks of the river were as splendid as the moon, and the surface of the water in that river was covered with lotus flowers. \* \* \* It never left \* \* \* in all seasons it was very deep. \* \* \* The moon shone very beautifully on its rapid streams, and resembled a mirror. The temples were as free from impurities as the hearts of gods are pure from all vice. \* \* \* In the river there were all kinds of fish. \* \* \* That victorious Rajá who had subdued all his passions, used to live in those palaces. \* \* \* They were more beautiful than women who are adorned with all kinds of ornaments, and the Raja had made this city the museum of all the curiosities of the world. \* \* \* It is well known that Baolis are usually embellished by kumud flowers, but these Baolis were so beautifully constructed and ornamented that kumud flowers owed their beauty to them. \* \* \* This Rajá was as glorious and powerful as the gods. The Hill of white stones which shone like the moon in the cold season derived its beauty from the occasional visits of this Monarch who had planted numerous trees (on it.) He conquered all his enemies. \* \* \* This city \* \* \* was repopulated by him.

The writer of these verses was \* \* \* and the person who transcribed them on this stone was Anrudh.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR SEPTEMBER, 1847.

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The regular monthly meeting of the Asiatic Society was held on Wednesday evening, the 1st. September, 1847.

The LORD BISHOP, in the chair.

The minutes of last meeting were read and confirmed, and the accounts and vouchers for August laid on the table as usual.

The following gentlemen were ballotted for and duly elected members of the Society :—

Dr. Lamb, Superintending Surgeon.

Gilson R. French, Esq.

William McDougal, Esq.

*Major Waugh*, the Surveyor General of India, was named for ballot at the October meeting; proposed by B. H. Hodgson, Esq., seconded by Dr. W. B. O'Shaughnessy.

In consequence of the absence of Major Marshall, his notice of motion, that all sections and committees of the Society be authorized to elect their own Secretaries, was not brought forward.

Read letters from H. M. Elliott, Esq., Secretary to the Government of India, Foreign Department, accepting Mr. Frith's offer to join the Thibet Mission.

From H. M. Elliott, Esq., Secretary to Government of India Foreign Department, promising to forward Lieutenant Strachey's narrative of his tour in the lake districts of Manasarowar and Rakas Tal.

From Major Anderson, C. B., Ishapore, forwarding a paper on the route of the Chinese traveller Hiuan Tshang.

From Mr. Logan, Singapore, with a paper on Lamination and Laminar Coloration accompanying Iron-masked Walls in the Sedimentary Rocks of Singapore, &c.

From B. H. Hodgson, Esq., on the Tame Sheep and Goats of the sub-Himalayas and Thibet.

From Capt. William Munro, announcing his retirement from the Society in consequence of his departure to England.

From H. Cope, Esq., forwarding, on the part of the Archæological Society of Dehli, a memoir by Messrs. Cope and Lewis "on the Town and Palace of Feerozabad, in the vicinity of Dehli."

From Capt. Kittoe, on the route of Fa Hian through the Province of Behar.

From Baboo Nrependernath Tagore, Honorary Secretary to the Tuttwabodhini Sabha, presenting a copy of the first Kulpa of the "Tuttwabodhini Patrika."

From Baboo Debendernath Tagore, forwarding a Buddhistical image recently exhumed in the vicinity of the Temple of Tribeni, near Hooghly.

On the part of the Council of the Society the Secretaries submitted their unanimous recommendation—that Capt. William Munro, be elected an Honorary member of the Society, as a tribute of their sense of the zeal and success with which he has applied his varied scientific attainments to numerous enquiries of general utility during his late service in India.

That Capt. Munro's report on the Timber Trees of Bengal be forwarded to the Military Board, as that of the Asiatic Society, with the due acknowledgment of the valuable aid Capt. Munro has afforded, also that the Report be published in the Journal.

A letter having been received by Mr. Laidlay from Colonel Sykes, announcing that the Court of Directors had sanctioned the immediate publication of the Rig Veda in London, to be edited by Dr. Muller, with a translation by Professor Wilson, at an expense of Rs. 40,000, the Council felt it to be their duty to direct the immediate suspension of all outlay on the edition of the same work recently sanctioned by the Asiatic Society of Bengal under the editorial management of Dr. Roer.

With this resolution Dr. Roer at once complied, and addressed the subjoined letter to the Council, recommending that instead of the Rig Veda the Society undertake to publish the Sanhita of the Yajus Veda, one of equal importance.

*Extract of a letter from COL. SYKES, dated "India House," 2d July, 1847.*

"The views I propounded in my notes upon Ancient India, are making some progress on the continent. Monsr. Manfred, in his recent work, "*Essai sur l'origine des principaux Peuples Anciens*" has adopted, with few exceptions, the whole of my opinions; and justifying his adoption upon logical deductions. We shall presently, I suspect, have further reason to acknowledge the soundness of some of these opinions in the revelations of the Rig Veda, the text of which the Asiatic Society will be glad to learn, the Court of Directors have authorized to be published, together with an English translation, at the expense of £4000. The Editor is a very profound Oriental Scholar, although a young man, Dr. Max Muller. His labours will extend over a period of five years."

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TO DR. W. B. O'SHAUGHNESSY,

*Senior Secretary, Asiatic Society,*

*Dated Asiatic Society, the 27th August, 1847.*

SIR,—I have the honour to acknowledge the receipt of your letter, dated the 20th instant, and in reply to report to you for the information of the Committee of Papers, that in compliance with their instructions I have put an immediate stop to the progress of the work relative to the proposed edition of the Sanhita of the Rigveda, and that in the course of this month I shall submit to the Society the portion that has been completed.

As it is not stated in the letter of Col. Sykes, that a commencement of the edition has been made in London, I beg to submit it to the Society, whether they think fit to place as much of the text and commentary, as is ready for the press, after having passed the Oriental Section, at the disposal of the Honourable the Court of Directors.

Although under the circumstances set forth in your letter, I fully agree with the propriety of discontinuing the printing of the Rigveda, yet I do not perceive a reason why the printing of this Veda at home should induce the Society entirely to give up an undertaking into which they have embarked before the eyes of the literary world, and of which the difficulties have been now for the greater part overcome.

The Sanhita of the Rigveda is but a small portion of the Vedas, a complete edition of which requires the united energies of many colabourers. I would

therefore suggest to the Society to go on with their work, and to publish within the space of five years in which the Sanhita of the Rig will be printed in London, another part of the Vedas, for instance, the Sanhita of the Yajur, which is of equal importance. Thus the wishes of the Directors and the learned public would be gratified, two parts, instead of one, of the important work at once appearing, and we would at the same time redeem the pledge which the Society for a long time has owed to the Directors. In conclusion I beg to draw the attention of the Society to the circumstance, that an edition of the Vedas in India possesses an advantage which is altogether wanting in Europe. Even the most distinguished scholar has to make a new study for the Vedas to master their language and grammar, but while in Europe he is limited to his own resources, he can here at every stage of the work avail himself of the assistance of Pundits, by which, to say the least, the publication must be greatly accelerated.

I have the honour to be, Sir,

Your most obedient Servant,

E. ROER,

*Co-Secretary, Asiatic Society, Oriental Dept.*

The Council regarding this proposal as deserving attentive consideration, recommended that the Oriental Section be solicited to report upon it at their earliest convenience for the information of the Society.

Dr. Roer also having most liberally proposed to place as much of the text and commentary of the Rig Veda as he had already prepared for the press, at the disposal of the Hon'ble the Court of Directors, the Council recommended Dr. Roer's offer for the acceptance and thanks of the Society.

Some discussion ensued as to the expediency of discontinuing the preparation of the Rig Veda on the unofficial communication above referred to.

It was observed, that having commenced in this country where greater facilities for accuracy and expedition existed, a text and commentary with translation, after much delay and application of the Oriental funds to other general uses of the Society, it must be desired not too hastily to drop the task, except with the exact knowledge of what was doing and wished to be done by the Home authorities.

Accordingly, on the proposition of Mr. Bushby, it was carried by a majority, that pending the reply to an immediate reference to the India



House, Dr. Roer be requested to proceed with his Edition of the Rig Veda.

Reports having been received from the Curators and Librarian in their several Departments, the meeting adjourned.

#### LIBRARY.

The following books have been received since the last meeting :

#### PRESENTED.

Rudimens de la Langue Hindoui ; par M. Garein de Tassy. Paris, 1847.—  
BY THE AUTHOR.

Proceedings of the Zoological Society of London, for the year 1838.—By  
E. BLYTH, Esq.

The Journal of the Indian Archipelago and Eastern Asia, No. 1.—By  
J. R. LOGAN, Esq.

The Oriental Baptist, No. IX.—BY THE EDITOR.

Upadeshak, No. IX.—BY THE EDITOR.

The Oriental Christian Speetator, No. VIII.—BY THE EDITORS.

The Calcutta Christian Observer, for August, 1847.—BY THE EDITORS.

Meteorological Register kept at the Surveyor General's Office, Calcutta,  
for the month of July, 1847.—FROM THE SURVEYOR GENERAL'S OFFICE.

Record of cases treated in the Mesmerie Hospital from November 1846 to  
May 1847, with Reports of the Official visitors, (two copies.)—BY THE BEN-  
GAL GOVERNMENT.

Le Moniteur des Indes—Orientales, et Occidentales, Tome II. No. II.—  
BY THE EDITOR.

#### EXCHANGED.

Calcutta Journal of Natural History, No. 29.

The London, Edinburgh, and Dublin Philosophical Magazine, No. 203-4.

Journal Asiatique, Nos. 41-2.

The Athenæum, Nos. 1023-4.

#### PURCHASED.

Journal des Savans, Avril et Mai, 1847.

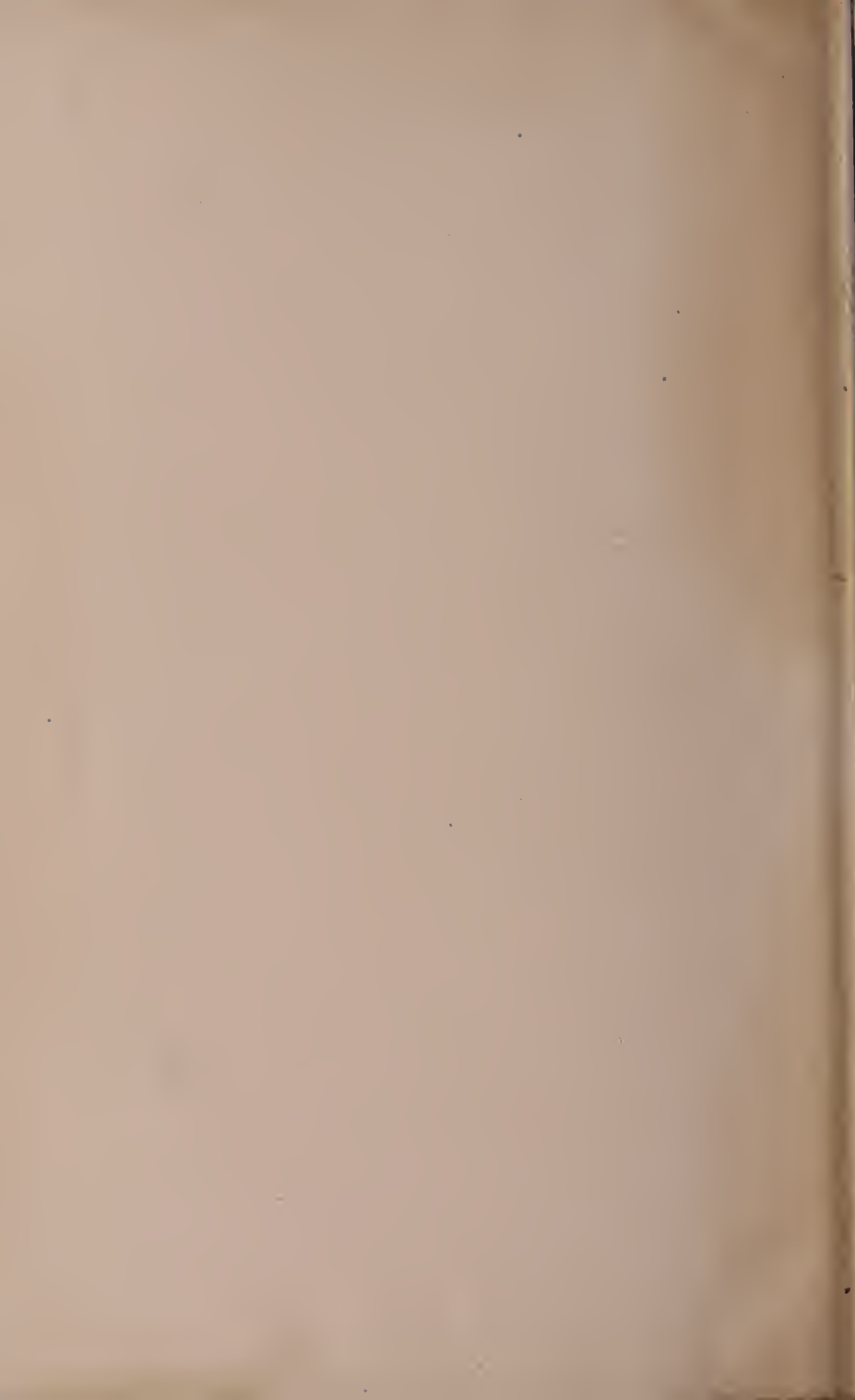
Ferguson's Latin Dictionary.

Meadows' French Dictionary.

*Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of Sept. 1847.*

| Days of the Month. | Maximum Pressure observed at 9h 50m. |              |                  |             |       | Minimum Pressure observed at 4 p. m. |                                      |              |                  |             | Maximum Temperature. | Rain Gauges.   |                    | Moon's phases. |                                      |            |            |
|--------------------|--------------------------------------|--------------|------------------|-------------|-------|--------------------------------------|--------------------------------------|--------------|------------------|-------------|----------------------|----------------|--------------------|----------------|--------------------------------------|------------|------------|
|                    | Barometer reduced to 32° Fahrenheit. | Temperature. |                  |             | Wind. | Aspect of the Sky.                   | Barometer reduced to 32° Fahrenheit. | Temperature. |                  |             |                      | Wind.          | Aspect of the Sky. |                | Direction from 9.50 a. m. to 4 p. m. | Upper Inch | Lower Inch |
|                    |                                      | Of the Air.  | Of the Wet Bulb. | Of the Air. |       |                                      |                                      | Of the Air.  | Of the Wet Bulb. | Of the Air. |                      |                |                    |                |                                      |            |            |
| 1                  | In. 29.679                           | 90.0         | 86.8             | 81.9        | E.    | Cumulo strati.                       | In. 29.391                           | 84.5         | 84.8             | 81.0        | S. E.                | Cloudy.        | 0.08               | 0.14           |                                      |            |            |
| 2                  | .674                                 | 87.8         | 85.5             | 80.8        | S.    | Cloudy.                              | .614                                 | 85.2         | 84.9             | 80.3        | S.                   | Ditto.         | 0.80               | 0.87           |                                      |            |            |
| 3                  | .653                                 | 87.4         | 86.5             | 82.0        | S.    | Cumuli.                              | .515                                 | 86.0         | 85.0             | 81.6        | S.                   | Nimbi.         | 0.13               | 0.20           |                                      |            |            |
| 4                  | .593                                 | 89.5         | 86.9             | 81.9        | S.    | Cumulo strati.                       | .479                                 | 88.5         | 87.4             | 82.0        | S. E.                | Cloudy.        | 0.05               | 0.12           |                                      |            |            |
| 5                  | .590                                 | 90.0         | 88.4             | 82.4        | E.    | Ditto.                               | .493                                 | 88.8         | 87.0             | 82.3        | S. E.                | Ditto.         | ..                 | ..             |                                      |            |            |
| 6                  | .601                                 | 90.0         | 87.7             | 82.0        | S. E. | Cumuli.                              | .473                                 | 89.0         | 87.8             | 80.8        | E.                   | Ditto.         | ..                 | ..             |                                      |            |            |
| 7                  | .583                                 | 90.5         | 88.4             | 81.8        | E.    | Cloudy.                              | .478                                 | 83.5         | 83.0             | 80.0        | E.                   | Ditto.         | ..                 | ..             |                                      |            |            |
| 8                  | .605                                 | 88.6         | 87.0             | 82.0        | E.    | Ditto.                               | .505                                 | 89.0         | 87.4             | 81.3        | S. E.                | Cumulo strati. | 0.06               | 0.13           |                                      |            |            |
| 9                  | .670                                 | 86.5         | 86.2             | 82.0        | E.    | Ditto.                               | ..                                   | ..           | ..               | ..          | ..                   | ..             | ..                 | ..             |                                      |            |            |
| 10                 | .675                                 | 86.1         | 85.5             | 80.0        | S. E. | Cumulo strati.                       | .542                                 | 91.0         | 90.0             | 80.8        | S. E.                | Cumulo strati. | ..                 | ..             |                                      |            |            |
| 11                 | .635                                 | 90.5         | 88.8             | 82.0        | S. E. | Ditto.                               | .517                                 | 87.0         | 85.0             | 80.8        | N.                   | Cloudy.        | 0.21               | 0.28           |                                      |            |            |
| 12                 | .663                                 | 90.0         | 89.0             | 80.8        | S. E. | Ditto.                               | .593                                 | 91.5         | 88.7             | 79.4        | S. E.                | Ditto.         | ..                 | ..             |                                      |            |            |
| 13                 | .707                                 | 89.2         | 89.0             | 82.5        | E.    | Ditto.                               | .623                                 | 78.0         | 78.2             | 76.0        | N.                   | Drizzly.       | 1.84               | 1.98           |                                      |            |            |
| 14                 | .695                                 | 87.0         | 86.0             | 81.0        | E.    | Cloudy.                              | .584                                 | 87.0         | 86.0             | 80.8        | S.                   | Cloudy.        | 0.26               | 0.32           |                                      |            |            |
| 15                 | .648                                 | 85.4         | 85.0             | 81.4        | N.    | Ditto.                               | .520                                 | 85.0         | 84.2             | 80.1        | N. E.                | Ditto.         | 0.98               | 1.09           |                                      |            |            |
| 16                 | .551                                 | 86.0         | 84.0             | 80.5        | E.    | Rain.                                | .478                                 | 80.8         | 81.0             | 79.0        | S.                   | Nimbi.         | 0.10               | 0.18           |                                      |            |            |
| 17                 | .630                                 | 81.8         | 81.3             | 79.4        | S. W. | Cloudy.                              | .520                                 | 86.5         | 84.2             | 80.5        | S.                   | Cloudy.        | 1.14               | 1.28           |                                      |            |            |
| 18                 | .689                                 | 85.0         | 84.9             | 79.5        | S. W. | Cirro cumuli.                        | .585                                 | 88.0         | 87.0             | 80.8        | S.                   | Cumulo strati. | 0.22               | 0.31           |                                      |            |            |
| 19                 | .762                                 | 82.0         | 82.3             | 77.4        | S.    | Cloudy.                              | .674                                 | 88.5         | 86.6             | 80.0        | S. W.                | Cumuli.        | ..                 | ..             |                                      |            |            |
| 20                 | .830                                 | 90.0         | 87.8             | 81.2        | S.    | Cumulo strati.                       | .728                                 | 87.5         | 85.0             | 79.0        | S.                   | Cumulo strati. | ..                 | ..             |                                      |            |            |
| 21                 | .827                                 | 89.0         | 88.0             | 81.0        | S.    | Ditto.                               | .678                                 | 91.0         | 89.0             | 80.8        | N.                   | Very cloudy.   | ..                 | ..             |                                      |            |            |
| 22                 | .808                                 | 88.5         | 86.5             | 80.0        | S.    | Ditto.                               | .686                                 | 91.8         | 89.8             | 80.0        | S.                   | Cumulo strati. | ..                 | ..             |                                      |            |            |
| 23                 | .842                                 | 89.0         | 88.0             | 82.5        | S.    | Ditto.                               | .721                                 | 86.4         | 86.5             | 79.0        | S.                   | Ditto.         | 0.12               | 0.18           |                                      |            |            |
| 24                 | .858                                 | 85.8         | 85.0             | 80.2        | S.    | Ditto.                               | .734                                 | 85.0         | 84.8             | 79.8        | S.                   | Cloudy.        | 1.97               | 2.00           |                                      |            |            |
| 25                 | ..                                   | ..           | ..               | ..          | ..    | ..                                   | ..                                   | ..           | ..               | ..          | ..                   | ..             | ..                 | ..             |                                      |            |            |
| 26                 | .815                                 | 88.7         | 87.9             | 81.2        | S. W. | Cumulo strati.                       | .706                                 | 90.7         | 88.4             | 79.8        | W.                   | Cloudy.        | ..                 | ..             |                                      |            |            |
| 27                 | .778                                 | 91.0         | 89.0             | 83.0        | E.    | Ditto.                               | .642                                 | 91.0         | 89.5             | 81.1        | S.                   | Ditto.         | 0.52               | 0.61           |                                      |            |            |
| 28                 | .803                                 | 86.2         | 86.0             | 84.0        | N. E. | Cloudy (Cirro cumuli).               | .646                                 | 85.0         | 83.5             | 78.0        | S. E.                | Cirro cumuli.  | ..                 | ..             |                                      |            |            |
| 29                 | .801                                 | 86.0         | 84.1             | 79.2        | E.    | Cloudy.                              | .654                                 | 90.0         | 87.5             | 77.0        | E.                   | Cumulo strati. | ..                 | ..             |                                      |            |            |
| 30                 | .746                                 | 80.5         | 81.0             | 78.0        | N. E. | Ditto.                               | .642                                 | 78.5         | 78.0             | 77.0        | S.                   | Rain.          | 1.23               | 1.26           |                                      |            |            |
| Mean               | 29.704                               | 87.5         | 86.3             | 81.1        |       |                                      | 29.598                               | 86.8         | 85.7             | 80.0        |                      |                | 9.71               | 10.95          |                                      |            |            |





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